THE IRON TRADE REVIEW

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Iron Ore Shipments Largely Exceed Record Year

Blast Furnaces Produce Greatest Daily Tonnage —Pig Iron Quiet—Mill Activity Continues

Some of the leading steel companies report that tonnages for various products booked in November were even heavier than in record-breaking October. The Steel Corporation adheres to its policy of quoting the present prices on leading products for delivery throughout 1913 and some of the independent companies are following a similar policy, while others are catering to demands for prompt delivery and continue to receive handsome premiums. An advance in the price of wire products by the leading interest is expected before Jan. 1. In the Chicago district, some of the leading mills are finding it increasingly difficult to take any orders for delivery prior to Jan. 1, 1914, and promises of delivery during the second half of next year are being made on large tonnages of first half business. Advance reports indicate that all records were broken by November for the production of sheets. The outlook is that 1912 will make a new record for the production of tin plate. Some makers of steel bars in the Pittsburgh district are practically out of the market, as they have booked sufficient tonnage to keep their mills in operation through the first half of next year.

Pig Iron Production

A new record for daily average production of coke and anthracite pig iron was made in November when the blast furnaces made an average of 87,827 tons daily, an increase of 1,074 tons, compared with the previous record made in February, 1910. The production for November was 2,634,802 tons, and for the 11 months of 1912 it was 26,543,461 tons, which was only 301,853 tons below the entire production for 1910, the banner year. The production of 29,000,000 tons for the year is almost certain.

Iron Ore

The movement of Lake Superior ore by lake for the season was 47,426,801 tons, or nearly five million tons more than the movement of the previous record year, 1910. With the addition of the all-rail shipments, the total movement for the year will be about 48,500,000 tons.

A very large percentage of the Lake Superior Bessemer ore for 1913 has been sold and the non-Bessemer market is fairly active, but merchant furnaces are placing orders rather cautiously, as some of the ores now being purchased will not be used for 20 months and decided changes in conditions may come in that time. Offers of 8 cents per unit for first quality Cuban Bessemer ore, made by eastern Pennsylvania furnaces, have been declined by the mining companies. Owing to uncertainty as to the tonnages which can be shipped from Cuba, steel companies controlling Cuban ores are cautious about selling. In 1906, the purchases of lake ore by eastern steel companies amounted to about 1,500,000 tons, but as the heaviest buyer of that year, which bought about 800,000 tons, now has deposits of its own, heavier buying by other consumers will be necessary in order to make the total this year exceed a million tons.

Pig Iron

The pig iron market lacks snap. Following the extremely heavy buying of past weeks, this was probably to be expected, but those who believe that a halting market is a forerunner of weakness are watching the present situation very closely. In the south, considerable tonnage has been sold recently at $13.50, Birmingham, for No. 2, although the usual quotation was considerably higher, and the low priced iron seems to have been pretty well absorbed in the Alabama district, but reports in the market indicate that Virginia iron purchased on speculation has been sold at concessions. The absence of a lively demand for spot iron in eastern territory is somewhat disappointing. Prices of pig iron are being well maintained in central western territory. It has become known that the 2,500 tons of a lot of spot basic purchased a week ago by an eastern steel company will be furnished by another eastern steel company, which recently has not been an active seller. Producers in the Buffalo territory report continuous heavy inquiry for malleable, foundry and basic from the consumers in that district and also from Canadian buyers. One Buffalo maker, which has sold malleable freely at $17.50 and upward, is now out of the market entirely and this grade seems well established at $18. Negotiations for some good sized tonnages for delivery to New England points have developed in foundry and basic.

Old Material

The old material market in some centers, especially eastern territory, is weak. An unusually open winter, permitting the collection of large tonnages of scrap, has doubtless had its effect upon the market.

PITTSBURGH

Decided Scarcity of Pig Iron

Office of THE IRON TRADE REVIEW,
2148-49 Oliver Bldg., Dec. 3.

Officials of iron and steel manufacturing interests believe that present prosperous conditions will continue for at least four or five months. Mills have been exceedingly careful about accepting contracts for next year's delivery and at this time it does not look as if any cancellations will be made. The much-discussed revision of the tariff on the steel and metal schedules naturally attracted interest, but little or no fear is entertained.

That present prices of most products will continue until the end of the year, is the belief of the trade. Plates, shapes, sheets and iron and steel bars, are bringing rather fancy prices when anything like prompt delivery is made.

Heaviest melters of pig iron are again feeling the market for additional tonnages, and some embarrassment has been experienced because of the unusual shortage of steel-making iron. If blast furnaces were able to offer metal, it is probable that the recent heavy buying movement would be equalled from a standpoint of sales.

Pig Iron.—So far as actual sales are concerned, the pig iron market is comparatively quiet, although there is considerable inquiry for steel-making grades. The heaviest melters in this, the Youngstown, O., and Johnstown, Pa., districts are informally negotiating for additional tonnages, but no sales have been made. All of the interests in the market at present took part in the recent heavy buying movement, at the close of which many believed a period of quiet would characterize the market until the end of the year.

Consumers are asking prices on whatever tonnages blast furnaces are able to offer. According to expressions made by some of the oldest pig iron merchants, the market at present is experiencing the most acute shortage in several decades. It is not uncommon for consumers who have been unable to cover requirements to borrow whatever pig iron competing interests are able to offer.

Bessemer is in greatest demand, although at least two melters are anxious to obtain basic. W. P. Snyder & Co. advise that the average prices of Bessemer and basic in November were $17.172 and $16.192, respectively, valley furnaces, compared with $17 and $16.184 for the preceding month, which indicates that Bessemer advanced $0.172 and basic $0.008.

The relatively poor showing made by basic was due to the sale of a large tonnage at the beginning of November at $16, valley. About 45,000 tons of basic were sold during each of October and November. Bessemer sales in October aggregated 50,000 tons and in November, 95,000 tons. These figures do not include heavy tonnages obtained by the Cambria Steel Co., Johnstown, Pa. An Erie, Pa., interest has closed for 1,750 tons of prompt basic at $16, valley furnace. Quotations remain unchanged and are as follows:

(Remainder of Year and First Quarter.)

Bessemer, valley	$17.25
Bessemer, Pittsburgh	18.15
Basic, valley	16.50
Basic, Pittsburgh	17.40
No. 2 foundry, valley	17.50
No. 2 foundry, Pittsburgh	18.40
Malleable, valley	17.25 to 17.50
Malleable, Pittsburgh	18.15 to 18.40
Gray forge, valley	16.00 to 16.50
Gray forge, Pittsburgh	16.90 to 17.40

Ferro-Alloys.—Sellers of 80 per cent ferro-manganese are now uniformly quoting $65, seaboard, for forward delivery, the nominal $61 quotation having been withdrawn a few days ago. No sales for shipment after Jan. 1 are noted. As high as $75, seaboard, has been obtained on small lots of ferro-manganese for prompt shipment. Fifty per cent ferro-silicon is quoted at $75, Pittsburgh. No large sales have been made since that to the heaviest consumer about 10 days ago.

We quote 80 per cent ferro-manganese at $73 to $75, Baltimore, for prompt delivery and $65 for forward shipment. The freight rate from Baltimore to Pittsburgh is $1.95 per ton.

Fifty per cent ferro-silicon is quoted at $75, Pittsburgh, for prompt and forward delivery; 12 to 13 per cent, $25 to $26, 11 to 12 per cent, $24 to $25; 10 to 11 per cent, $23 to $24; 9 to 10 per cent, $22 to $23, f. o. b. Globe, Jisco and Ashland furnaces. The freight rate to Pittsburgh is $1.90. The foreign grades are held at $1 or more a ton over domestic prices.

On ferro-titanium we quote 8 cents per pound for carload lots; 10 cents per pound for 2,000 pound lots and over, and 12½ cents per pound in lots up to 2,000 pounds.

Plates.—Plate consumers are urging shipments and considerable complaint is heard on account of deferred deliveries. There has been continued heavy new demand and specifying has not fallen off. All of the mills, with the exception of those that have declined to sell, have enough tonnage on their books to keep mills running at maximum capacity until the end of the first half.

The bulk of the tonnage is being placed at 1.50c, although prices are quoted at a spread from 1.45c to 1.60c. Prompt plates easily bring as high as 1.90c. Prices follow:

Standard steel plates ¼ inch thick, 6¼ to 100 inches, 1.45c to 1.60c for shipment after Jan. 1 and 1.65c to 1.90c for prompt shipment. For extras, see card of Sept. 1, 1909.

Sheets.—Early reports indicate that all previous November records were broken last month in the sheet industry. Manufacturers advise that specifications against contracts were unusually heavy and that new business was above normal. All serviceable mills are running at maximum capacity, although this does not mean that plants are operating on the 100 per cent base, as none of the mills has been able to obtain the desired tonnage of raw material for several weeks.

The scarcity of semi-finished steel products is more serious than the labor shortage. Heaviest consumers have covered requirements for the first half of the year and there has been demand for third and fourth quarter material. On forward delivery, prevailing quotations are being firmly maintained. One of the independent mills, in a position to make rather prompt delivery, today advised that it was obtaining $1.85 for No. 10 gage blue annealed sheets, $2.40 for No. 28 black and $3.60 for No. 28 gage galvanized sheets, which is $4, $3 and $4, respectively, above the prevailing prices for these grades.

The year has been most satisfactory to sheet makers. Prices have been more uniform and prevailing quotations have been maintained with few exceptions throughout the entire year. We quote for prompt delivery No. 10 gage blue annealed, $1.80 to $1.85; No. 28 gage black, $2.35 to $2.40; No. 28 gage galvanized $3.55 to

$3.60. Prices for forward delivery on all grades are:

Flat Sheets.

Black Sheets.—Nos. 10-12 gage, $1.90 per 100 pounds; Nos. 13-14 gage, $1.95; Nos. 15-16 gage, $2.00; Nos. 17-21 gage, $2.05; Nos. 22-24 gage, $2.10; Nos. 25-26 gage, $2.15; No. 27 gage, $2.20; No. 28 gage, $2.25; No. 29 gage, $2.30; No. 30 gage, $2.40.

Tin mill sizes, Nos. 15-16 gage, $2.00 per 100 pounds; Nos. 17-21 gage, $2.05; Nos. 22-24 gage, $2.10; Nos. 25-27 gage, $2.15; No. 28 gage, $2.20; Nos. 29-30 gage, $2.25; Nos. 30½-31 gage, $2.30; No. 32 gage, $2.35.

Blue Annealed.—Nos. 3-8, $1.60 per 100 pounds; Nos. 9-10, $1.65; Nos. 11-12, $1.70; Nos. 13-14, $1.75; Nos. 15-16, $1.85.

Galvanized.

Nos. 10-11 gage, $2.40 per 100 pounds; Nos. 12-14 gage, $2.50; Nos. 15-16 gage, $2.65; Nos. 17-21 gage, $2.80; Nos. 22-24 gage, $2.95; Nos. 25-26 gage, $3.10; No. 27 gage, $3.25; No. 28 gage, $3.40; No. 29 gage, $3.55; No. 30 gage, $3.70.

Roofing Sheets

Net extras on all gages per 100 pounds. Corrugated 2-inch, 2½-inch, 3-inch and 5-inch corrugation, 5c; 2 V crimped without sticks, 5c; corrugated 1¼-inch corrugation, 10c; 3 V crimped without sticks, 10c; pressed standing seam with cleats, 15c; plain roll roofing with or without cleats, 15c.

Painted Roofing.

12 to 18 gage, inc., 5c; 19 to 24 gage, inc., 10c; 25 to 28 gage inc., 15c.

Tin Plate. — It is estimated that heaviest consumers of tin plate, including salmon packers, condensed milk can factories and fruit and vegetable packers have covered requirements for their respective seasons for 1913. Although it is impossible to make predictions at this time, many in the trade believe that 1913 will equal the present year, which promises to be a banner year in the industry from the standpoint of production. The year has been eminently satisfactory from nearly every standpoint, although some manufacturers claim the present cost of raw materials warrants an advance in the price of tin plate. The prevailing prices follow:

Coke tin plate, 100-pound basis, 14 x 20, $3.60, f. o. b. mill, Pittsburgh district.

Rails. — Although no large orders have been placed this week, mills rolling rails have sold considerable tonnage for emergency purposes. Traction companies throughout the country are ordering Bessemer standard sections and lumber camp and mine interests continue to buy light rails freely. Light rails are quoted on the same base as standard sections, although an early advance of about $2 is expected.

Several producers of standard spikes are asking 2c for standard sizes and we now quote standard railroad spikes at a spread from 1.90c to 2c. The bulk of the tonnage is being sold at the minimum figure. Spike manufacturers are about two months deferred in deliveries. Rails are quoted as follows, with the base price on open-hearth steel sections at 1.34c per pound at the mill:

Fifty-pound and heavier, 1.25c per pound; carloads and less than 500 tons, 1.34c per pound; light rails on base weight of 40 to 45 pounds, 1.25c, the schedule on the other weights being irregular and subject to negotiations; angle bars for standard sections, 1.50c, Pittsburgh; track bolts, 2.40c to 2.50c, base, Pittsburgh.

Railroad Spikes.

4½, 5 and 5½ and 9-16	1.90c to 2.00c
3, 3½, 4, 4½ and 5 x ½	.10
3½, 4 and 4½ x 7-16	.20
3, 3½, 4 and 4½ x ⅝	.30
2½ x ⅝	.40
2½, 3 and 3½ x 5-16	.60
2 x 5-16	.80

Billets and Sheet Bars.—There is practically no change in the market for semi-finished steel products. Because of the infrequency of sales, it is possible only to quote the market nominally. Quotations herewith represent the market as accurately as possible, and if mills were able to produce surplus tonnages, it is probable this price would be shaded somewhat. What little surplus is produced brings whatever figure sellers care to ask.

The scarcity of semi-finished steel products has affected the market generally and some of the sheet and tin plate mills have been forced to reduce operations because of inability to obtain tonnages of steel. We quote as follows:

Bessemer 4 x 4 billets with 0.25 carbon and less are quoted at $27.00, with the usual extra for size and analysis, and open-hearth rolling billets, $27.50. Bessemer sheet and tin bars are quoted at $28.00 and open-hearth sheet bars are quoted $28.50, f. o. b. Pittsburgh and Youngstown, with full freight to destination added. Forging billets are quoted at $34.00, Pittsburgh.

Hoops and Bands. — There is no change in the market for hoops and bands. Demand continues fairly heavy and specifying has been liberal. We quote the market as follows:

Hoops in carload lots, 1.50c to 1.60c, Pittsburgh, in less than carload lots, 1.55c to 1.60c; bands, 1.40c to 1.45c, base, with net extras, as per standard steel.

Merchant Bars.—A number of makers of steel bars are practically out of the market, having booked sufficient tonnage to keep mills in operation through the first half of the year. Steel bars now are quoted at a range from 1.40c to 1.45c, although the bulk of the tonnage has been sold at the minimum price. It is almost impossible, consumers advise, to obtain steel bars for anything like prompt delivery. One of the mills has asked as high as 1.90c for prompt material.

Iron bars continue to be quoted at a spread from 1.70c to 1.80c, although many in the trade believe the minimum quotation will be withdrawn shortly. Cold rolled shafting is firm on a basis of 60 per cent off for carloads and 55 per cent off for less than carload lots. Quotations follow:

Common iron bars, 1.70c to 1.80c, Pittsburgh; Bessemer and open-hearth steel bars, 1.40c to 1.45c; plow and cultivator, 1.40c to 1.45c; channels, angles, zees, tees, under 3 inch, 1.50c to 1.55c, all f. o. b. mill. The following differentials are maintained on steel: Less than 2,000 pounds and not less than 1,000 pounds of a size, 0.15 advance, less than 1,000 pounds of a size, 0.35. Cold rolled and ground shafting, 60 per cent off in carloads and 55 per cent in less than carloads delivered in base territory.

Bolts, Nuts and Rivets.—Demand for rivets, nuts and bolts continues heavy. Rivet makers are two months deferred in shipments, and several nut manufacturers will not be able to fill orders now on the books for from three to five months. Demand for small rivets has been comparatively heavy and an early advance is expected. There has been a slight change in discounts on machine bolts and cold pressed C and T nut discounts have been changed slightly.

Small rivets 7-16 x 6, smaller and shorter, are quoted at 75, 10, and 10 off. Metallic tin rivets are quoted 3½ cents per pound net extra and tin plated rivets in bulk are quoted at 1½c per pound net extra. Rivets in metallic tin packages are quoted 70, 10, and 10 off.

Quotations which are slightly different from those of a week ago, follow:

Rivets

Button head structural rivets, 2.10c; cone head boiler rivets, 2.20c. Small rivets 75, 10 and 10 off.

Bolt and Nut Discounts

Carriage bolts, ⅜ x 6 inches, smaller and shorter, rolled threads, 75, 10 and 2½; cut threads, 75 and 7½; larger and longer, 70 and 5.

Machine bolts with hot pressed nuts, ⅜ x 4 inches, smaller and shorter, rolled, 75, 10, and 7½; cut, 75, 10 and 2½; larger and longer, 70, 10.

Gimlet and cone point lag or coach screws, 80 and 10.

Hot pressed square, blank or tapped nuts, $5.80 off list; hot pressed hexagon blank or tapped, $6.40.

Cold pressed C. & T. square, blank or tapped, $5.80 off; hexagon, blank or tapped, ⅜-inch and larger, $6.70 off; ½ inch and smaller, $7.30 off.

Structural Shapes.—The McClintic-Marshall Construction Co. has taken an order from the Industrial Works, Bay City, Mich., for a new, 155 x 520-foot, machine shop involving 1,400 tons of fabricated steel. Work will begin March 1. The J. & J. B. Milholland Co. has taken a contract for lock gates and dams in the Trinity river, Texas, involving 35 or 40 tons. No other important contracts have been taken by fabricators in this district. Structural shapes are quoted at a spread from 1.45c to 1.60c for forward delivery and consumers advise it is almost impossible to ob-

tain material for prompt shipment. We quote the market as follows:

Standard structural shapes, 1.45c to 1.60c, for shipment after Jan. 1 and 1.60c for prompt shipment. For extras see card of Sept. 1, 1909.

Merchant Pipe.—Considerable interest is taken in the announcement of the National Tube Co., Nov. 27, that it will change pipe weights and lists generally on Jan. 1, 1913. Although pipe manufacturers have been advised of specific changes, the trade will not be informed of changes by the leading interest until the end of the year. Action is being taken to improve quality, but not to raise prices. Present lists will be effective until the new one is adopted. Independent pipe manufacturers already have signified their intention to base quotations on lists sent out by the National company.

Demand for both iron and steel pipe has fallen off, due to the fact that none of the mills is able to promise additional material this year. Several large inquiries, which have been mentioned in THE IRON TRADE REVIEW, are still pending and probably will be carried over into the first quarter. Prevailing discounts to jobbers subject to the usual preferential discount to the large buyers are as follows:

Iron and Steel Pipe Basing Prices.

STEEL.

	Butt.		Lap.	
	Black.	Galv.	Black.	Galv.
⅛, ¼ and ⅜ inch.	72	52	..	..
½ inch	76	66	..	..
¾ to 3 inch	79	71	..	..
2 inch	..	..	76	68
2½ to 6 inch	..	..	78	70
7 inch to 12 inch	..	..	76	66
13 to 15 inch	..	..	53	..
Extra Strong, Plain Ends.				
⅛, ¼ and ⅜ inch.	68	58	..	..
½ inch	73	67	..	..
¾ to 1½ inch	77	71	..	..
2 to 3 inch	78	72	..	..
2 inch	..	..	74	66
2½ to 4 inch	..	..	76	68
4½ to 6 inch	..	..	75	67
7 to 8 inch	..	..	68	58
9 to 12 inch	..	..	63	53
Double Extra Strong Plain Ends.				
½ inch	63	57	..	..
¾ to 1½ inch	66	60	..	..
2 to 2½ inch	68	62	..	..
2 inch	..	..	64	58
2½ to 4 inch	..	..	66	60
4½ to 6 inch	..	..	65	59
7 to 8 inch	..	..	58	48

IRON.

⅜ inch	66	47	..	..
½ inch	70	57	..	..
¾ to 2½ inch	73	62	..	..
2 inch	..	..	69	59
2½ to 6 inch	..	..	71	62
7 to 12 inch	..	..	69	56
Extra Strong Plain Ends, Card Weight.				
⅜ inch	64	53	..	..
½ inch	68	61	..	..
¾ to 1½ inch	72	63	..	..
2 and 2½ inch	73	64	..	..
2 inch	..	..	67	59
2½ to 4 inch	..	..	71	62
4½ to 6 inch	..	..	70	61
7 to 8 inch	..	..	64	54
9 to 12 inch	..	..	59	48
Double Extra Strong Plain Ends, Card Weight.				
½ inch	58	50	..	..
¾ to 1½ inch	61	53	..	..
2 and 2½ inch	63	55	..	..
2 inch	..	..	56	50
2½ to 4 inch	..	..	61	55
4½ to 6 inch	..	..	60	54
7 and 8 inch	..	..	53	43

Plugged and reamed pipe is furnished at 2 points higher price, either butt or lap weld.

The above discounts are for full weight pipe, subject to a variation of 5 per cent, merchant pipe, when specified, being furnished up to 6 inches at one point higher discount (lower price).

Boiler Tubes.—With the approach of the new year, the boiler tube market has become comparatively quiet. There has not been much new demand, but specifying has continued liberal. Discounts are:

	Steel.	Iron.
1½ inch	..	..
1¾ to 2¼ inch	62	47
2½ inch	64½	52
2¾ to 3¼ inch	69½	54½
3½ to 4½ inch	72	57
5 and 6 inch	64½	..
7 to 13 inch	62	..

To destination east of Mississippi river will be sold at delivered discount for carloads lowered by 2 points, for lengths 22 feet and under; longer lengths, f. o. b. Pittsburgh. Usual extras to jobbers and boiler manufacturers.

Wire.—There has been practically no change in the market for wire products. The leading interest continues to quote nails at $1.70 and plain wire at $1.50 and a number of independents are asking $1 a ton above these figures. There has been considerable tonnage sold for delivery next year and some of this has been taken on the basis of $1.75 for nails. Demand, however, is not especially heavy, although specifying has continued liberal. Cut nails, western makers, continue to be quoted at $1.70. We quote the market as follows:

Wire nails, jobbers' carload lots, $1.70 to $1.75, retailers' carload lots, $1.75 to $1.80; cut nails (western makers), jobbers' lots, $1.70; painted barb wire, jobbers' carload lots, $1.70 to $1.75; retailers' carload lots, $1.75 to $1.80, with 40c for galvanizing; plain wire to jobbers in carloads, $1.50 to $1.55; and to dealers, in carloads, $1.55 to $1.60; polished staples, $1.70 to $1.75; galvanized staples, $2.10.

Wire Rods.—There has been considerable demand for wire rods and consumers from all parts of the country are urging shipments. A number of interests have sent representatives to this district in an effort to hasten deliveries and to obtain additional tonnages whenever possible. It is rather difficult to obtain material for anything like prompt delivery, although occasionally mills are able to offer lots of unspecified tonnage. We quote both Bessemer and open-hearth wire rods $30, Pittsburgh.

Car Wheels.—The Carnegie Steel Co. has taken an order from the Norfolk & Western railroad for 4,000 freight car wheels and several other good orders have been received. Thirty-three-inch freight car wheels are quoted at a spread from $15 to $15.50, and 36-inch passenger train car wheels are quoted at a range from $19 to $19.50.

Coke.—The Wheeling Steel & Iron Co., Wheeling, W. Va., has closed negotiations for 30,000 tons of contract furnace coke for 1913 delivery, at somewhere between $3.10 and $3.25, ovens, and a Sharpsville furnace interest has obtained 8,000 tons a month for first half shipment. Last Thursday, one of the coke producers sold 120,000 tons at $3.25, ovens, for shipment next year and this price is considered the present minimum for 48-hour fuel. Some dealers are refusing to shade $3.50, ovens. Prompt furnace coke this week has been selling between $3.90 and $4, ovens, which is somewhat below the market the latter part of last week.

The Christmas demand has not yet begun. When it does begin, many in the trade believe spot furnace coke will go to $4.50, ovens. There has been considerable demand for foundry coke, which is selling at a spread from $4.50 to $4.75, ovens, in the spot market. Contracts are being closed between $4 and $4.25, ovens.

The Connellsville *Courier* for the week ending Nov. 23, says production made a gain of 4,035 tons over the week before, almost the entire increase being made by furnace ovens. Shipments made a net increase of 198 cars. Production went above 400,000 tons for the week. We quote as follows:

Connellsville furnace	$3.90 to 4.00
Connellsville furnace contract	3.25
Connellsville foundry	4.50 to 4.75
Connellsville foundry contract	4.00 to 4.25

Old Material.—There is practically no change in the market for old materials. Quotations of last week continue to prevail and the general market is about the same as it was several days ago. All of the embargoes in this district have been lifted and shipments no longer are restricted. Many in the trade express the opinion that present quotations will continue effective the remainder of the year.

Heaviest consumers are fairly well covered and dealers have not yet shipped all the tonnage taken on a basis of $16.25 for heavy melting steel. We quote per gross ton for delivery in this district as follows:

Heavy melting scrap	$15.00
Rerolling rails	16.50 to 17.00
Malleable	14.50 to 15.00
Agricultural malleable	13.25 to 13.75
Bundled sheet scrap	13.00 to 13.50
Iron axles	25.00 to 26.00
Old iron rails	16.75 to 17.25
Stove plate	11.00 to 11.50
No. 1 wrought scrap	15.50 to 16.00
Old car wheels	15.75 to 16.25
Low phosphorus	18.00 to 18.50
Machine shop turnings	11.00 to 11.50
No. 1 busheling	14.25 to 14.75
Country mixed	11.00 to 11.25
Cast borings	10.25 to 10.50
No. 1 cast scrap	14.50 to 15.00

CHICAGO

Some Deliveries Extended Nearly a Year

Office of THE IRON TRADE REVIEW,
1328 Monadnock Blk., Dec. 3.

In spite of a seasonal dullness during the past two weeks, the total of specifications against contracts in finished lines received during November falls but little short of establishing a new record. The opening of the present month has brought no diminution in active demand, and melters in this territory are being besieged by consumers who wish to place new business. Mills of the Steel Corporation are willing to take new business at current prices when the delivery is satisfactory to the buyer, but as this sometimes involves a period of almost a year, these prices may be regarded as nominal. Independent producers continue to fight off second half business and are filled for the first half. Promises of delivery during the second half are already being made on considerable first half business. Although prompt delivery is practically impossible in finished lines, when it can be obtained the current quotations rule. However, 1.90c has been obtained on very small tonnages of bar iron for prompt mill delivery.

Pig Iron. — The pig iron market seems to have relapsed into a state of comparative quiet during the past week. Although there has been a fair run of small inquiries no large tonnages have been reported. Some sellers of southern iron in this market appear willing to shade $14, Birmingham, for prompt delivery, but it is probable that most of the iron involved is held on warrants. Fourteen dollars seems to be the minimum furnace quotation for delivery during the remainder of the year, and prices for first quarter delivery range from $14 to $14.50. The former price, however, can be obtained on but few brands. Northern iron remains firm at $18, local furnaces, with one strong Chicago interest continuing to quote $18.25. Although both inquiries and sales are comparatively light, an increasing number of melters are ordering iron shipped ahead of contract delivery, which would indicate a greater consumption than was anticipated.

Sales made during the week include 500 tons sold by a southern producer at $14.50, Birmingham, for first quarter delivery, and another lot of 500 tons sold at the same price for delivery during the second half. The Home Stove Works has taken 500 tons of southern iron for first quarter delivery at a price understood to be in the neighborhood of $14, Birmingham.

The following prices represent the market for Chicago delivery, except northern foundry and malleable Bessemer, which are quoted f. o. b. local furnaces:

	Prompt shipment.	First quarter.
Lake Superior charcoal	$18.75	$18.75
Northern foundry No. 2	18.00	18.00
Southern foundry No. 2	18.35	18.35
South'n Silveries, 5 per cent sil.		19.85
Jackson co. silv'r's 8 per cent.	21.40	21.90
Malleable Bessemer	18.00	18.00
Alabama basic		18.85

Merchant Bars.—Efforts to substitute bar iron for steel bars are resulting in increasing firmness in the market for the former material. A larger amount of business is being placed at 1.60c and no difficulty is being experienced in obtaining 1.55c for exceptionally attractive lots carrying several dollars per ton in extras. There has been a slight falling off in specifications during the week, which was to be expected at this time. The delivery situation remains about the same, shipments being made in from four to six weeks. Very high prices have been paid for immediate shipments of small lots of 20 to 50 tons of bar iron, one order noted going at 1.90c. Mills of the Steel Corporation are quoting current prices on steel bars for forward shipment, but as this involves a period of almost a year, prices are largely nominal. It is almost impossible to obtain prompt delivery in steel, but where openings in rolling schedules permit of it, no premiums are asked.

We quote, f. o. b. Chicago, as follows:

Bar iron, 1.55c to 1.60c, hard steel bars, rerolled, 1.65c to 1.75c, soft steel bars, bands and small shapes, 1.63c; hoops, 1.63c; smooth finished machinery steel, 1 inch and larger, 1.78c; shafting 60 per cent off list for carload lots, 55 per cent off for less than carloads.

On iron and steel from local stock we quote as follows:

Bar iron, 1.95c per pound base; soft steel bars, 1.95c per pound base; soft steel hoops, 2.20c, full extras.

Structural Material.—Sellers in this territory, including both western producers and eastern mills, are reluctant to accept business for second half delivery on account of the probable heavy unfilled tonnage for the first half. Specifications against first half contracts are already running over into the third quarter and delivery at that time is being promised on an increasing amount of first half business. Subsidiaries of the Steel Corporation are still willing to take new business if the delivery is satisfactory to the buyer, but as this sometimes involves a period of almost 12 months, a comparatively small amount of such business is being placed. Fabricators are having great difficulty in obtaining material to fill structural contracts, and this condition is reflected in the awards made during the week. The contracts placed include 795 tons of structural material for spans taken by the American Bridge Co. from the Chicago, Burlington & Quincy Co. The Commonwealth Mining & Milling Co. has let a contract for 460 tons of structural steel for a cyanide plant at Pearce, Ariz., and the Nokomis Coal Co. has let a contract for 145 tons for a coal tipple at Nokomis, Ill.

We quote, f. o. b. Chicago, as follows:

Beams and channels, 15 inch and under, 1.68c. For extras, see Pittsburgh report.

Store prices are as follows:

All angles, 3 inches and larger, including 6 inches, $2.05 per 100 pounds; angles over 6 inches, $2.15 per 100 pounds, base; beams, 3 to 15 inches, inclusive, $2.05 per 100 pounds, base; channels, 3 inches and larger, $2.05 per 100 pounds, base.

Rails and Track Fastenings.—Western railroads continue to display considerable activity in the purchase of both rails and track fastenings, and although the week has been rather light in other lines, no falling off in the specifications in the latter has been apparent. Although the larger part of the rail requirements in this territory has been contracted for, some good tonnages remain which have not been placed.

We quote light rails, f. o. b. Chicago, and track fastenings, f. o. b. Joliet, as follows:

Light rails, carloads, 25 to 45-pound, 1.30c; 16 to 20-pound, 1.35c; 12-pound, 1.40c; 8-pound, 1.50c.

Light section relayers, 45 pounds and un-

der, subject to inspection, $22 to $24; standard section relaying rails, subject to inspec-

Track fastenings, f. o. b. Joliet, angle bars 1.50c; railroad spikes, 1.95c; smaller size spikes, 1.75c base; track bolts with square nuts, 2.30c to 2.40c.

Plates.—A reaction from the previous week is evident in car buying, but sufficient orders have been placed or are pending to more than keep up the average for the year. The Minneapolis & St. Louis is in the market for 3,000 box cars and the Chicago, Burlington & Quincy has ordered 1,500 freight cars. The Rutland has ordered five passenger coaches of the Osgood Bradley Car Co., and the Denver, Northwestern & Pacific is in the market for 1,000 box cars and 400 50-ton gondolas. Independent producers in this territory are still maintaining a reluctant attitude toward second half business, although subsidiaries of the Steel Corporation are willing to take new orders if the delivery is satisfactory to the consumer. Owing to the impossibility of securing early delivery and to the fact that forward shipments cannot be made for almost a year, prices remain largely nominal.

We quote, f. o. b. Chicago, as follows:

Tank plates, ¼ inch thick, 6⅝ to 100 inches wide, 1.68c. For extras, see Pittsburgh report.

Store prices are as follows:

Tank steel, ¼ inch and heavier, up to 72 inches wide. $2.05.

Bolts, Nuts and Rivets.—In spite of the sharp advance on structural rivets, there is no apparent decrease in demand and no amelioration of the situation has been accomplished. The market for bolts and nuts remains very firm, although no advances have been made as yet.

We quote prices on bolts, nuts and rivets as follows:

Rivets

Structural rivets, ¾ to 1¼ inches, 2.28c, base. Chicago, in carload lots; boiler rivets, 0.10c additional.

Bolt and Nut Discounts

Carriage bolts up to ⅝ x 6 inches, rolled thread, 75-10-2½; larger sizes, 70-5.

Machine bolts up to ⅝ x 4 inches, rollel thread, 75-10-7½; cut thread 75-10-2½; larger sizes, 70-10.

Hot pressed nuts, square head, $5.80 off per cwt.; hexagon, $6.40 off per cwt.

Sheets.—It is possible that a small tonnage of sheets may be available for delivery late in the second quarter, but in quantities that will have no perceptible effect on the market. Prices remain very firm and western producers are continuing to refuse second half business.

We quote, f. o. b. Chicago, as follows:

Blue annealed, No. 10, 2.15c; No. 12, 2.20c. Box annealed, No. 28, 2.70c. Galvanized No. 28, 3.95c.

For mill prices, see Pittsburgh report. Freight to Chicago, 18 cents.

Wire Products.—Contrary to expectations in some quarters, the leading interest is still adhering to its previous quotations, although some of the independent producers remain firm at the advanced price. Business in this territory is fairly active and the substitution of wire products for some sizes of steel bars is causing an increased consumption.

We quote, f. o. b. Chicago, as follows:

Wire nails, jobbers' carload lots, $1.88; retailers' carload lots, $1.93; retailers' less than carload lots, $1.98; painted barb wire, jobbers' carload lots, $1.88; retailers' carload lots, $1.93; retailers' less than carload lots, $1.98, with 40c for galvanizing; plain wire, jobbers' carload lots, $1.68; retailers' carload lots, $1.73.

Merchant Pipe and Tubes. — The market for this material remains quiet as compared with the activity of previous weeks. This condition is welcome to makers in this territory, who are taking every advantage of the opportunity it affords to clear their books of unfilled orders. Prices are firm with an upward tendency.

We quote, store prices on merchant pipe and tubes, as follows:

Iron and Steel Pipe Basing Prices.

	Steel.		Iron.	
	Black.	Galv.	Black.	Galv.
Butt.				
⅛ inch and ¼ inch.	69.2	48.2	62.2	41.2
⅜ inch	73.2	62.2	67.2	51.2
½ inch to 1¼ inch.	76.2	67.2	70.2	58.2
Lap.				
2 inch	73.2	64.2	67.2	57.2
2½ inch to 6 inch.	75.2	66.2	68.2	59.2
Card Weight.				
7 inch to 12 inch...	72.2	61.2	66.2	55.2
Extra Strong Plain Ends.				
Butt.				
⅛, ¼, ⅜ inch.....	64.2	52.2	59.2	47.2
½ inch	69.2	57.2	64.2	52.2
2 inch to 3 inch....	74.2	62.2	....	....
Lap.				
2 inch	70.2	58.2	65.2	53.2
7 inch to 8 inch....	64.2	52.2	59.2	47.2
Double Extra Strong.				
Butt.				
½ inch	57.2	45.2	....	....
¾ inch to 1½ inch	60.2	48.2	....	....
Lap.				
2 inch	58.2	46.2	....	....
2½ inch to 6 inch..	59.2	47.2	....	....
7 inch to 8 inch....	52.2	40.2	....	....

Tubes.

	Lap weld steel.	Charcoal iron.	Shelby seamless.
	Per cent.	Per cent.	Per cent.
1 inch	37	..	55½
1¼ to 2¼ inch.....	53	38	34
2¾ to 3¼ inch.....	63	48	44
3½ to 4½ inch.....	65½	48	44
5 to 6 inch.....	53	..	..

Cast Iron Pipe.—Bids will be closed today on approximately 500 tons of water pipe required by the city of Winnipeg, and some other small lots are pending. The larger municipalities are still out of the market. Although requirements have been compiled in many cases, no action can be taken until after the first of the year, when appropriations will be made. Specifications for small tonnages are very satisfactory and prices are firm.

We quote, f. o. b. Chicago, as follows:

Four-inch water pipe, $31, 6 to 12 inches, $29, larger sizes, $28, gas pipe, $1 a ton higher.

Old Material.—The condition of the scrap market is practically unchanged. While such sales as were made during the week were at the current quotations, the tone of the whole market is weak and further declines will not be surprising. With the exception, however, of a shading of 25 cents on arch bars and transoms, no falling off on individual items has occurred. Embargoes are being maintained in a number of instances and dealers are reluctant to lower their prices for fear that they will not find takers, thus establishing the market on an even lower basis. Railroad offerings have been comparatively light and the present condition of the market may be ascribed largely to the increased production of scrap by consumers of finished lines, together with the large stocks in the hands of both dealers and consumers.

We quote for delivery in consumers' yards, Chicago, as follows:

Gross Tons

Old car wheels	$14.75 to 15.25
Old iron rails	17.00 to 17.50
Rerolling rails (5 ft. and over)	16.25 to 16.75
Old steel rails (3 ft. and und.)	14.50 to 15.00
Frogs, switches and guards	13.75 to 14.25
Heavy melting steel	13.50 to 14.00
Shoveling steel	13.50 to 14.00

Net Tons

No. 1 R. R. wrought	$12.75 to 13.25
No. 2 R. R. wrought	11.75 to 12.25
Arch bars and transoms	16.75 to 17.25
Knuckles, couplers and springs	12.75 to 13.25
Shafting	16.50 to 17.00
Iron car axles	21.50 to 22.00
Steel car axles	17.75 to 18.25
Locomotive tires	13.50 to 14.40
Dealers forge	10.75 to 11.25
Pipe and flues	10.00 to 10.50
No. 1 cast	13.50 to 14.00
No. 1 busheling	11.25 to 11.75
No. 2 busheling	8.50 to 9.00
No. 1 boiler cut	10.00 to 10.50
Boiler punchings	13.00 to 13.50
Cast and mixed boring	7.25 to 7.75
Machine shop turnings	8.25 to 8.75
Railroad malleable	13.50 to 14.00
Agricultural malleable	12.25 to 12.75
Angle bars, splices, etc., iron	16.50 to 17.00
Angle bars steel	12.50 to 13.00
Stove plate and light cast scrap	11.00 to 11.50

J. & J. B. Milholland, Pittsburgh, machinery manufacturers and structural steel fabricators, have been awarded the contract for the machinery and structural steel to be used in the erection and operation of lock gates and dams at the American shoals and dam No. 7 in the Trinity river, Texas. About 35 or 40 tons of steel will be involved.

CLEVELAND

Record Breaking Ore Movement

Office of THE IRON TRADE REVIEW,
Penton Bldg., Dec. 3.

Iron Ore.—Shipments of iron ore for November were 4,066,129 tons, compared with 2,523,253 tons in November, 1911. The movement for the season up to Dec. 1 was 47,414,730 tons. There have been shipped from Two Harbors this month 4,151 tons and it is estimated that 8,000 tons will be shipped from Escanaba, where two boats are still to be loaded. Adding this tonnage, 12,151 for the two ports, to the movement up to Dec. 1, the estimated movement for the year is 47,426,801 tons. This lake movement compares with other years as follows:

1905	33,476,904
1906	37 513,595
1907	41,288,755
1908	25,427,094
1909	41,683 873
1910	42,620,201
1911	32,130,411

With the addition of the all-rail shipments, the total shipments for the year 1912 will be about 48,500,000, or about 5,000,000 more than the record year, 1910. It is expected that there will be great activity on the iron ranges this winter, limited only by the supply of labor. Some difficulty is already being experienced in getting miners. One superintendent, who was directed to open two mines which have not been in operation this year, reported that he could not get enough miners to operate the two properties, but would be able to operate one.

A very large percentage of the Bessemer ores has now been sold and the buying of non-Bessemer ores has continued at a fairly active rate. Some of the merchant furnaces hesitate about buying at the present time, as they prefer to await developments. Very few merchant furnaces have covered for their full requirements. Officials of merchant furnaces point out that the average time for consumption of ore purchased now will be 12 months ahead and that some ore purchased now will not be consumed for 20 months, for which reason they are disposed to be very deliberate about buying large tonnages.

On base ores with the guarantee of 55 per cent on old range and Mesabi Bessemer, and 51½ per cent on old range and Mesabi non-Bessemer, we quote as follows: Old range Bessemer, $4.40; Mesabi Bessemer, $4.15; old range non-Bessemer, $3.60; Mesabi non-Bessemer, $3.40.

Pig Iron.—Cleveland furnaces have no difficulty in obtaining $17.75, delivered, in this city. Demand is not active at the present time, but the market is firm without the slightest indication of weakness. Foundries are very busy and are taking all the iron contracted for, but no buying is reported for the second half of next year. For delivery this year and the first half of next year, we quote as follows:

No. 1 foundry	$18.25 to 18.75
No. 2 foundry	17.75 to 18.00
No. 2 southern	18.35 to 18.85
Bessemer	18.15 to 18.40
Lake Superior charcoal	19.10 to 19.75
Silveries, 8 per cent silicon	20.55 to 21.55
Bessemer ferro, 11 per cent	26.55

Coke.—While the blowing out of two or three furnaces has thrown some spot coke on the market, it is being quickly absorbed and prices are being firmly maintained.

Connellsville furnace coke, $3.75 to $4.00 for prompt delivery, and $3 to $3.25 on contract; Connellsville foundry coke, $4.50 for prompt, and $4.00 to $4.25 on contract.

Finished Material.—The general contract for the Cleveland Electric Illuminating Co. building on the Public Square has been awarded to James L. Stewart Construction Co., Pittsburgh. It is understood that T. H. Brooks & Co., who will furnish the 1,500 tons of steel required, will take nearly all of it from stock. There are not very many building projects which will call for steel during the winter, but there is a good prospect of six or seven buildings of size being erected in the spring, on which the material will be largely concrete, but a considerable tonnage of reinforcing bars will be required. It is expected that work on the construction of the piers of the Detroit-Superior bridge will be pushed as rapidly as the weather will permit. Work will also be pushed on the Hocking Valley dock at Toledo. Hard steel angles have been advanced $1 per ton within a week and $2 within the last three weeks. Quotations on hard steel angles are now 1.60c to 1.65c, Pittsburgh, and 1.45c to 1.50c on bars. Iron rolling mills are in a very comfortable position and are declining nearly all business offered. They are unable to give deliveries in less than 60 to 90 days and prefer not to book additional orders until they catch up to some extent on deliveries. Some of the large steel companies will be compelled to carry over into next year large tonnages of unfilled orders on which specifications have been received. On the other hand, the American Steel & Wire Co. has made a great record in cleaning up on contracts and is now working on business booked for next year.

Old Material.—Dealers in scrap are busy shipping on old contracts, with which they are well booked, and are not making urgent efforts to secure new business. Outside points are making fair inquiry for heavy melting steel, which has advanced 50 cents. Cast scrap and bundled sheet scrap continue in good demand, with the latter selling at an increase of 25 cents. The general tone of the market is steady. Revised quotations, f. o. b., Cleveland, follow:

Gross Tons.

Old iron rails	$17.75 to 18.50
Old steel rails (under 6 ft.)	15.00 to 15.50
Old steel rails (over 6 ft.)	16.25 to 16.75
Relaying rails	25.00 to 26.00
Old steel boiler plate	11.50 to 12.00
Malleable iron (railroad)	14.50 to 15.00
Steel axles	19.50 to 20.00
Axle turnings	12.50 to 13.00
Malleable iron (agricultural)	13.00 to 13.50
Heavy steel	14.00 to 14.50
Country mixed steel	11.00 to 11.50
Bundled sheet scrap	11.75 to 12.25

Net Tons.

No. 1 R. R. wrought	$14.50 to 15.00
No. 1 busheling	12.50 to 13.00
No. 1 machine cast	13.50 to 14.00
No. 1 dealers' wrought	11.50 to 12.00
Machine shop turnings	8.25 to 8.50
Pipes and flues	10.00 to 10.50
Wrought drillings	8.50 to 8.75
Cast borings	8.00 to 8.50
Stove plate	10.50 to 11.00
Wrought iron piling plate	16.00 to 16.50
Wrought iron arch bars	17.00 to 17.50

Some Trainmen Return to Work

A number of trainmen employed by the Carnegie Steel Co. at the Homestead and Edgar Thomson plants returned to work this week, although the majority of the strikers are still out. The company will not reinstate men who circulated petitions for an advance in pay a couple of weeks ago, but has offered concessions to other striking employes.

The Edgar Thomson and Homestead plants, although not operating at capacity, are not crippled to the extent they were a week ago. Engines are operating at both plants and considerable stock is moving. The strike has not spread to other plants and it is probable that additional men will go back to work this week. Four of the 11 blast furnaces at Edgar Thomson and three of the seven Carrie stacks have been banked as a result of the strike.

PHILADELPHIA

Heavy Finished Material Contracting

Office of THE IRON TRADE REVIEW, Philadelphia, Dec. 3.

Heavy bookings in the form of contracts for first quarter delivery have been taken by eastern steel mills during the past week, especially in plates at 1.60c to 1.65c, Pittsburgh, or 1.75c and 1.80c, Philadelphia. Up to this time, eastern makers have not been disposed to take contracts freely. The Norfolk & Western railroad has placed about 25,000 tons of plates, shapes and bars largely with a Pittsburgh maker for the construction of 3,000 cars. New business in finished lines in the east is active, the mills are running full and are still losing ground on deliveries. Pig iron is quieter and there are some reports of Virginia speculative iron being done at concessions, but with producers prices are firm and strong and the general market has not weakened. Old material continues heavy and weak. Several steel makers are taking advantage of the low prices and have closed for round blocks of melting steel at $15 to $15.25, delivered.

Pig Iron.—A stationary condition of prices with a moderate buying for forward deliveries rules in the eastern Pennsylvania iron market. Consumption is heavy and some furnaces are taxed to keep up shipments, but there has been no great demand or shortage as yet in spot iron. This absence of a sharp spot demand which had been anticipated in some quarters, has been followed by reports in the market that some lots of metal, particularly Virginia iron, held in speculative hands, have been released to consumers at concessions under current prices. Sales of Virginia iron at full schedules of $16 and $15.75, furnace, respectively, for No. 2X and No. 2 plain, are reported, however, and there is no evidence of easier conditions in any other direction in the eastern market. Eastern Pennsylvania No. 2X remains firm at $18.50, Philadelphia, or $17.75, furnace, for forward, with $18.25, delivered, still offered for this year. On some brands not so well known, $18.25 can also be done forward. The B. & O. railroad has practically disposed of 2,000 tons of foundry grades for first half, of which 1,100 tons are for Baltimore. The Norfolk & Western railroad is inquiring for its last half requirements of its Roanoke shops, estimated at about 5,000 tons of coke and charcoal irons. A buyer in this district is inquiring for 1,000 to 1,500 tons of No. 2X for first quarter. A cast iron pipe maker has closed for 3,000 tons of forge and No. 3 for February-March shipment at reported prices of $17.75 and $18, delivered. This business went to eastern and Alabama makers. It develops that an eastern steel company which has not been a recent active seller in the market, will furnish 2,500 tons of the lot of spot basic purchased by another eastern steel company a week ago. The price paid for this iron was $18, delivered central Pennsylvania. The portion taken by the steel company seller was originally credited to a western Pennsylvania merchant interest. No negotiations for basic are now under way. In malleable, recent sales for delivery in this territory were made around $19.75, delivered, and small lots have brought $20, delivered. Standard low phosphorus for eastern shipment is firm at $24.50, Philadelphia basis, with small lots moving. For western shipment, this price might be shaded 50 to 75 cents. The Robesonia furnace will resume on low phosphorus around the first of the year. The Pennsylvania Steel Co. has blown in its small Lebanon furnace on low phosphorus and the larger furnace, which has been running on low phosphorus, has been switched to basic.

We quote for prompt and first quarter shipment, delivered to consumers' plants in Philadelphia and vicinity, as follows:

Eastern Pa. No. 1X foundry	$18.50 to 18.75
Eastern Pa. No. 2X foundry	18.25 to 18.50
Eastern Pa. No. 2 plain	18.00 to 18.25
Standard forge (Eastern Pa.)	17.50 to 17.75
Basic (Eastern and Central Pa.)	18.00 to 18.25
Virginia No. 2X	18.65 to 18.80
Southern No. 2	18.25 to 18.75
Malleable	19.50 to 19.75
Low phosphorus, Philadelphia	24.00 to 24.50

Iron and Steel Bars.—Pittsburgh makers have closed some third quarter contracts for steel bars in this territory at 1.40c, Pittsburgh, or 1.55c, delivered. The 2,000 tons of steel bars just placed by the Norfolk & Western railroad for second and third quarters were also taken largely by a Pittsburgh mill. Usually the larger makers are not actively offering tonnage beyond the second quarter as they are filled pretty solidly to July 1. Prompt steel bars are commanding 1.85c to 1.95c, this district. Bar iron makers in the east continue to book actively and their deliveries have fallen back to four to six weeks. Bar iron is very strong at a minimum of 1.60c, mill.

We quote for delivery to consumer's plants in Philadelphia and vicinity: Steel bars at 1.55c to 1.60c on contract and common bar iron at 1.67½c to 1.77½c. Prompt steel bars on mill shipments are quoted at 1.85c to 1.95c delivered and from store are quoted at 2c to 2.15c, delivered. Cut nails are quoted from $1.85 to $1.90, Philadelphia. Shafting is quoted at 60 and 55 off in base territory.

Plates and Shapes.—The Norfolk & Western railroad has closed for about 25,000 tons of shapes, plates and bars for delivery during the second and third quarters at Roanoke. This material is to be used for the construction of 3,000 steel cars. The original inquiry called for 21,000 tons of plates, 19,000 tons of shapes and 3,600 tons of steel bars for 5,000 cars, but the tonnage was cut down on final action. Pittsburgh makers took the bulk of the business, but some of it went to eastern mills. Eastern plate mills are now more actively closing contracts for first quarter at 1.60c, Pittsburgh, for sheared and 1.65c, Pittsburgh, for universals, or 1.75c to 1.80c, Philadelphia, respectively. The tonnage of this character during the past week has been heavy. These obligations are being held to first quarter. Plate deliveries with eastern mills run six to eight weeks. An eastern steel company is still in the market for 21,000 tons of plates for first half. Eastern structural shape mills generally quote 1.60c, Pittsburgh, or 1.75c, Philadelphia, on lots of size for regular deliveries running 12 weeks or more, but on small lots for early shipment 1.75c, mill, is quoted. Sizable sales at 1.60c for March and April are noted. John H. Miller, Inc., has the general contract for the department store of Stewart & Co., Baltimore, 1,000 tons. Plans are out for the Commonwealth bank building, Richmond. The government will soon ask bids on 1,000 tons for the Cristobal dock sheds, Panama. The Pennsyl-

vania railroad is placing some good-sized lots of shapes and plates for car construction at Altoona.

We quote delivered to consumers' plants in Philadelphia and vicinity: Sheared steel plates on contract 1.60c to 1.75c; universal steel plates on contract, 1.60c to 1.80c; sheared plates for early delivery, 1.75c to 1.80c; universal plates for early delivery 1.80c to 1.85c; structural shapes on contract 1.60c to 1.75c; structural shapes for early delivery 1.75c to 1.80c. Plates and shapes from store are quoted at 2.15c to 2.25c delivered.

Sheets.—The tonnage of new business in sheets continues to come in to eastern makers at a rate in excess of shipments. Deliveries are still falling back and range from six to eight weeks with leading eastern producers. Prices are firm.

We quote for delivery to consumer's plants in Philadelphia and vicinity, No. 10 gage blue annealed sheets at from 1.95c to 2.05c.

Semi-Finished Steel.—Regular sellers of steel continue to find themselves very short on their offerings and they are dealing usually in small tonnages. The demand for crude steel remains very acute and one or two eastern plants have been obliged to shut down for a few days at times because of shortage of material. A small sale of Bessemer billets at $32, eastern mill, is reported. A lot of below standard billets from the Pittsburgh district brought about $27.50, mill, or better than $30, delivered.

We quote delivered to consumer's plants in Philadelphia and vicinity 4 x 4-inch open-hearth and Bessemer rolling billets at $28.50 to $30.50 and forging billets at from $34.50 to $38.50.

Old Material.—An unusually open fall permitting the collection of large tonnages of miscellaneous materials up to this date, coupled with some bearish sentiment among dealers, which caused them to unload accumulations at lower prices, immediately following election, are designated as the causes for the present weakened market in old material. The situation has gained no strength in the week, but has lost ground in some grades and the present tone is not favorable. Some of the principal consumers are recognizing the relative cheapness of heavy melting steel and have bought liberally. One steel maker took 12,000 tons for first quarter at $15, delivered central Pennsylvania. The delivery point usually commands a lower price than eastern Pennsylvania. An eastern Pennsylvania buyer increased its recent purchases to a total of 8,000 to 10,000 tons. It obtained some small lots at $15, delivered, but in the main paid around $15.25, delivered. The iron mills have dropped their offers to $16.25 to $16.50, delivered, for No. 1 railroad wrought. Wrought pipe, borings, turnings and No. 1 forge are lower. An embargo is in force against the plant of the Lukens Iron & Steel Co., Coatesville, Pa.

We quote gross tons delivered to consumers' plants in eastern Pennsylvania and western New Jersey, as follows:

Old iron rails	$18.50 to 19.00
Old steel rails (rerolling)	17.00 to 17.50
No. 1 heavy melting steel	15.00 to 15.50
Old car wheels	15.00 to 15.50
Old iron axles	25.00 to 26.00
Old steel axles	20.50 to 21.50
No. 1 railroad wrought	16.50 to 17.00
Wrought pipe	13.75 to 14.25
Cast borings	11.25 to 11.75
Machine shop turnings	11.25 to 11.75
Heavy cast (broken)	15.00 to 15.50
Malleable	13.50 to 14.00
Stove plate	11.50 to 12.00
No. 1 forge	13.50 to 14.00
Low phosphorus	19.50 to 20.00

Freight rates per ton on scrap from Philadelphia to principal eastern consuming points are: $0.60 to Ivy Rock, Pa.; $0.65 to Phoenixville, Pa.; $0.80 to Coatesville, Pa.; $0.85 to Bethlehem, Pa., Reading, Pa., and Roebling, N. J.; $1.10 to Pottsville, Pa., Lebanon, Pa., and Columbia, Pa.; $1.25 to Harrisburg and Steelton, Pa.; $1.40 to Milton, Pa.

BIRMINGHAM

Producers Most Interested in Making Deliveries

Office of THE IRON TRADE REVIEW,
Birmingham, Ala., Dec. 3.

Pig Iron. — To local order-books, there were added in the past week, 2,000 tons of No. 2 foundry iron for export, 2,500 tons of analysis iron for delivery prior to Jan. 1, and an aggregate of 1,500 to 2,000 tons of other grades, in small quantities for prompt delivery. The prices received in the week are about in line with those of the week previous, the export tonnage having been entered at $14.50, Birmingham, and the same basis being the consideration for the lot of analysis iron. The small orders for spot delivery were entered at prices ranging from $14.25 per ton to $15, Birmingham, depending upon the several local furnace conditions. So far as indicated, the attitude of the consuming interests in the matter of additional advanced requirements at the figures being asked, has not changed. The inquiry being received from all quarters of the trade is in fair volume, but definite requirements are not being submitted, and with the approach of the holidays and the usual suspension of foundry operations, the general disposition to await further developments is more pronounced. The furnace interests continue most interested in the delivery of the tonnage already sold, and but little effort is being made to add to the tonnage on order-books, especially for shipment prior to the beginning of the second quarter. In one instance, it is understood that about 5,000 tons of certain grades are being offered for delivery in the first quarter, but only about 25,000 tons from the same operations remain to be sold in the second quarter. The price for second quarter deliveries is understood to be a basis of $15, Birmingham, with a differential of 50 cents per ton for the low grades, and $14.50, Birmingham, with a differential of 50 cents per ton for Nos. 3 and 4 foundry, is considered the market price for the remainder of the year and the first quarter. For this delivery, gray forge and mottled are being held at a differential of only 25 cents per ton on the No. 2 foundry price, and the available tonnage of such grades is of no consequence, practically. The Holt, Ala., furnace of the Central Iron & Coal Co., has just been blown in on foundry iron, and it is understood that an additional furnace will be blown in at North Birmingham in the next week or 10 days.

For delivery in the remainder of the year, and through first quarter, the schedule of prices below is quoted, per gross ton, f. o. b. cars at Birmingham furnaces:

For delivery during the remainder of this year and first quarter next:

No. 1 foundry	$14.50 to 15.00
No. 2 foundry	14.00 to 14.50
No. 3 foundry	13.75 to 14.25
No. 4 foundry	13.50 to 14.00
Gray forge	13.25 to 13.75
Basic	14.00 to 14.50
Charcoal	23.00 to 23.50

With the exception of charcoal iron, an advance of 25c to 50c per ton would be asked over the above figures for deliveries in the last quarter.

An advance of 50 cents per ton over the above figures, except for charcoal iron, would be asked for deliveries in the second quarter.

Cast Iron Pipe.—No large lettings have recently been held in this market, and there is a shortage of orders for certain sizes being produced. The volume of small orders, and especially for small size pipe and fittings, being received is very attractive for the season, but the absence of larger requirements is quite noticeable. The schedule of asking prices has not changed, and in view of the higher costs under which plants are being operated, it is not likely that shading for such business as is offered will result. We quote water pipe as follows, per net ton, f. o. b. cars here, viz.: 4-inch, $24.50; 6-inch and up, $22.50, with $1 per ton extra for gas pipe.

NEW YORK

Pig Iron Quiet and Sales Few

Office of THE IRON TRADE REVIEW,
1115 West Street Bldg., Dec. 3.

Iron Ore.—Offers of 8 cents per unit for first quality Cuban Bessemer ore have been made by eastern Pennsylvania furnaces, but have been declined by the miners, who are inclined to hold for 8½ cents per unit. Because of shortages in their own incoming supply due to the difficulty of obtaining vessel accommodations, the steel companies controlling the Cuban deposits are not desirous at present of offering much additional tonnage for sale. Trans-Atlantic foreign ores continue to be shut out of the east at competitive prices. If the tonnage of Lake Superior ores consumed in eastern Pennsylvania during the approaching year exceeds 1,000,000 tons, as is expected, this tonnage will be the heaviest since 1906. In that year, due largely to the purchases of one eastern steel company, the tonnage of lake ore shipped east reached approximately 1,500,000 tons.

Pig Iron.—The past week has been one of unusual quietness in the pig iron market in this district, and the sales have been rather meager. Open inquiry is light, but that buyers are still much interested in first quarter and first half deliveries is shown by their quiet requests for propositions from their regular sources of supply. Some sales of this quiet character have been closed. A Newark consumer is inquiring for 1,000 tons of No. 2X for first half, another buyer for 500 tons of high silicon iron and some smaller lots are out. One round lot of basic is under negotiation for eastern delivery. Eastern Pennsylvania prices have yielded in no way as a result of the quieter conditions and are well maintained at from $17.50 to $17.75, furnace, for No. 2X, or on a minimum of $18.25, tidewater. This price usually applies only to early delivery. The leading Virginia maker continues out of the market on No. 2X, but is selling the other grades at an unchanged schedule. Some speculative Virginia iron which has been bought around $15.25 and $15.50, furnace, for No. 2X, has been offered at concessions under the present market of $16, furnace, for No. 2X. Buffalo makers are strongly entrenched with business and prices there are very firm at $17.50, furnace, and upward for No. 2X. One maker there continues out of the market. We quote, for prompt and first quarter shipment at New York tidewater, as follows:

Northern foundry No. 1	$18.50 to 18.75
Northern No. 2X foundry	18.25 to 18.50
Northern No. 2 plain	18.00 to 18.25
No. 2 Virginia	18.80 to 19.20
No. 2 southern foundry	18.50 to 18.75
Malleable	19.50 to 20.00
Gray forge	17.50 to 17.75

Ferro-Alloys. — Ferro-manganese is again rising in price and several English makers have posted advances during the past week. One seller advanced from $61 to $65 for last half of next year; another from $61 to $63, for the same period, and has made some sales at this price, while a third interest holds unchanged at $61, although it is expecting early instructions for an advance from its principals. About 1,000 tons of last half material were booked in the week at $61, seaboard. For first half, the minimum of the market has settled to about $65, with some sellers quoting up to $70. Prompt ferro is around $75, seaboard. Inquiry is light. Foreign spiegeleisen has undergone a recent sharp advance of about $9 a ton and now considerably exceeds the price of domestic spiegel, of which recent small sales were made around $30, seaboard. Domestic makers are now advancing their prices. One large buyer of spiegeleisen recently closed with domestic makers for about 10,000 tons covering an extended forward period. Some inquiry for 50 per cent ferro-silicon is current.

We quote standard English 80 per cent ferro-manganese at $73 to $75, seaboard, for early shipment, $65, seaboard, for first half and $61 to $65 for second half; 50 per cent ferro-silicon on contract at $75, Pittsburgh or Philadelphia, for carloads, $74, for larger lots, and $73, for 600 tons or more.

Plates. — The Pittsburgh & Lake Erie railroad has placed orders for 1,000 55-ton hoppers each with the Standard Steel Car Co. and the Pressed Steel Car Co., making the recent purchases of this road, about 4,000 cars. This order is a part of the large New York Central car inquiry, which is now active in the market. A large number of cars, estimated at 25,000 to 30,000 tons, continue under negotiation, but awards are not so liberal. The Harriman lines, which have been figuring on a large block of cars, are expected to delay this purchase because of the supreme court decision. Plate specifications in November were very heavy in this district and including shapes and bars, exceeded, with some leading New York offices, even the record-breaking period of October. Eastern plate makers have been booking first quarter contracts more liberally and have entered some attractive tonnages recently at minimum prices of 1.60c, Pittsburgh, or 1.76c, New York, for sheared. Deliveries with leading eastern makers run six to eight weeks and with Pittsburgh mills five to six months. Some of the latter are still quoting 1.45c, Pittsburgh, and 1.60c, New York.

We quote, delivered at New York tidewater on going business, for last quarter or first quarter, 1.76c to 1.86c New York, on sheared plates. Some makers are asking $1 higher for universal plates. Plates from store are quoted at 2.15c.

Structural Shapes.—New lettings of fabricated material remain very moderate in this territory, but as the shops are well filled, the present inactivity occasions no great concern. The New England Structural Co. has taken 550 tons for the Harvard Club, Boston; the Lackawanna Bridge Co., 550 tons, for an addition to the Marion power house, Jersey City; the Noelke-Richards Iron Works has 900 tons for the Fayette National Bank building, Lexington, Ky., and 600 tons for the Marquand apartment, this city; the McClintic-Marshall Construction Co., 325 tons for a bridge on the Port Richmond division on the Philadelphia & Reading. The New York Central railroad has distributed orders for about 2,500 tons covering 12 bridges which was divided among the American Bridge Co. and three or four independent shops. This system also has up 1,400 to 1,500 tons for terminal areas in this city. The Atlantic Coast Line has placed 21 small bridges calling for about 250 tons with independent shops.

Several new projects, involving attractive tonnages, have appeared and a rather liberal total has been banked up, awaiting action. The commissioners of the port of Boston are out for 6,000 tons for port improvements which they stipulate must be completed by May 1. A large bonus is offered for the fulfillment of the contract on time and for-

feits for failure to complete within the alloted time. Bids are going in this week on an addition to the Brooklyn Arts and Science building, about 3,000 tons, and have been taken for the Consolidated Gas Co. building, this city, 2,500 tons. A school for Toronto, 1,000 tons, is pending. No announcement has yet been made on the steel for the Cotton Exchange, 3,000 tons, the erection of which is reported to have gone to Post & McCord; on the American Express Co. building, lower Broadway, about 2,000 tons, and on the Brody, Adler & Koch building, about 1,500 tons. A pier shed for the Lehigh Valley at Jersey City, 600 tons, is still up.

Shape prices with eastern mills are firm at 1.60c, Pittsburgh, or 1.76c, New York, with deliveries running 12 to 15 weeks. For small lots of prompt shapes, 1.75c, mill, or about 1.85c, New York, is usually quoted. Some Pittsburgh makers continue to offer shapes at 1.45c, Pittsburgh, or 1.60c, New York, but for deliveries five and six months ahead.

We quote for New York delivery as follows: Structural shapes, 1.66c to 1.76c. Structural shapes from store, 2.15c.

Iron and Steel Bars.—An active demand for bar iron continues with eastern mills at prices ranging from 1.60c to 1.70c at the mill and deliveries in some cases have fallen back several weeks. In steel bars, consumers are unable to get deliveries from the larger mills before some months and for prompt they are obliged to pay from 1.85c to 2c, New York, for deliveries by certain eastern mills or from store. Leading makers report very heavy steel bar specifications in this district in November.

We quote for New York delivery, steel bars at 1.56c and common iron bars at 1.65c to 1.70c. Steel bars from store are quoted at 2 cents.

Rails and Track Material.—It is announced by the Pennsylvania railroad that its supplemental rail orders reported last week bring its total tonnages for renewals for 1913 delivery to 183,800 tons. This is the heaviest tonnage ordered for renewals in the past 10 years, the highest previous tonnage having been in 1906, when about 164,000 tons were placed. The Pennsylvania Steel Co. will furnish 11,000 tons of the recent order and, as reported, the rest went to the Corporation, Bethlehem, Cambria and Lackawanna mills. The Pennsylvania Steel Co. has taken 1,500 tons of open-hearth rails of the recent Rock Island order and also 600 tons of girders for the Los Angeles railway.

We quote six-inch pipe at from $24 to $26, f. o. b. New York, in carload lots.

Cast Iron Pipe. — The week has been featured by the re-appearance of an active demand for pipe from private buyers for spring delivery and a considerable tonnage is now under negotiation. Covering by private consumers had remained very brisk up to several weeks ago, when it slowed perceptibly and its revival now is encouraging to pipe makers. Public lettings are light. Bids went in this week on 630 tons for New Bedford, Mass., and 825 tons for Washington, D. C. Considerable export business is pending. Prices still show some variations, but are fairly firm.

Old Material.—The market is soft and new orders are not plentiful. Further declines of 25 to 50 cents appeared in some grades in the week and the whole list shows a tendency to sag. Buyers continue to offer prices in many cases below the ideas of dealers or the real level of the market. The large accumulation of 45,000 to 50,000 tons of the Albany Waste & Metal Co., Albany, N. Y., is being bid upon today and is attracting general attention in the scrap trade. We quote, gross tons, prices New York dealers will pay at tidewater, as follows:

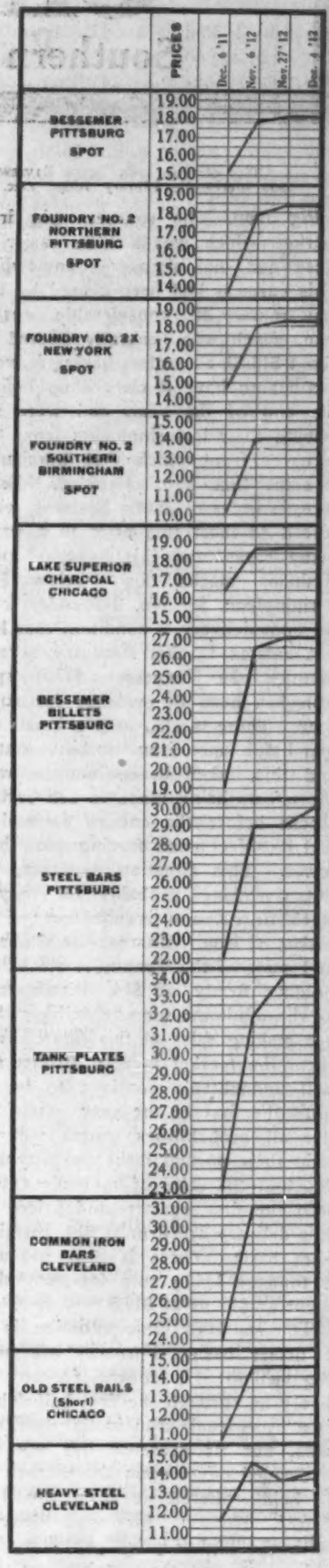
Old car wheels	$13.50 to 13.75
Old iron axles	22.00 to 22.50
Steel axles	17.00 to 17.50
Old steel shafting	16.00 to 16.50
No. 1 heavy melting steel	12.50 to 13.00
No. 1 R. R. wrought	14.25 to 14.75
Wrought pipe (not galvanized)	11.25 to 11.50
Cast borings	9.50 to 10.00
Machine shop turnings	9.75 to 10.00
Heavy cast	12.00 to 12.50
R. R. malleable	10.50 to 10.75
Stove plate	9.25 to 9.50
Grate bars	8.25 to 8.50

Freight rates on scrap per ton to Steelton, Pa., Columbia, Pa., Pottsville, Pa., and Harrisburg, Pa., are $1.50 from Jersey City, and $2.00 from New York; to Coatesville, Pa., Ivy Rock, Pa., Phoenixvile, Pa., and Reading, Pa., $1.50 from Jersey City, and $1.80 from New York; to Bethlehem, Pa., $1.10 from Jersey City, and $1.60 from New York; to Roebling, N. J., $1.00 from Jersey City, and $1.50 from New York; to Milton, Pa., $1.60 from Jersey City, and $2.00 from New York; to Jersey City, $1.00 from New York; to Newark, $1.10 from New York

Harbison-Walker Report

The tenth annual report of the Harbison-Walker Refractories Co., Pittsburgh, issued Dec. 4, shows net earnings for the fiscal year of $1,395,932.68. After deducting expenditures for repairs and improvements, depreciation and depletion charges, net profits aggregated $1,321,689.76. The net surplus for the year is $325,127.26. The surplus account Sept. 30, 1911, was $5,215,060.52, and at the end of the fiscal year closing Sept. 30, 1912, the surplus account was $5,540,187.78. Officials of the company are: H. W. Croft, president; Hay Walker, vice president; O. M. Reif, vice president; Hamilton Stewart, secretary, and William Walker, treasurer.

PRICE CHART



CINCINNATI

Southern Pig Iron Recovers More Firmness

Office of THE IRON TRADE REVIEW, 503 Mercantile Library Bldg., Dec. 3.

Pig Iron.—The southern pig iron market, which was a little easier, a week ago, has recovered somewhat. This easiness had been caused by the appearance of considerable resale iron, which was generally offered at about $13.50, as dealers having it were anxious to have it cleared up before the end of the year, and were receiving their last shipments from the furnaces from which they purchased it some time ago. Furnaces, therefore, in order to obtain business, were forced to meet this price in a great many cases, and this brought some Alabama stacks down below $14, Birmingham, for No. 2 foundry iron, for spot delivery, a condition that had not existed in this state for several months. In Tennessee, $13.50 spot iron has been in evidence for some time. There is also only a small demand for spot iron in both states, and this, taken in conjunction with the efforts being made to sell certain stocks before the end of December, had its effect upon forcing quotations lower. This situation, however, did not last long, probably for only a week or so, and is not true of all makes of iron. Most of the Alabama and some of the Tennessee stacks are holding firmly at $14, Birmingham, as the minimum for any delivery, and are making sales at this figure. With them the market is very strong, and will undoubtedly continue to be so, until the first of the year, when, under all probabilities, prices will regain their normal level and strength. Most of the sales being made extend into the first quarter, and prices for this delivery are firm at $14, Birmingham basis. There is also, as large a tonnage being sold for spot shipment at $14 as at $13.50.

The southern Ohio situation is on a firmer basis. Furnaces are holding well at $17, Ironton, for any delivery up through the first half. There is a little resale iron in this territory, also, but its presence has not had a decided effect upon the market. It is being offered at from $16.50 to $16.75, Ironton, for spot delivery, with the higher price prevailing.

Inquiries in the market are few, and are usually not of a general nature. A Michigan melter wants from 1,000 to 1,500 tons of low phosphorus iron for first half shipment, and a central Ohio user is in the market for a small tonnage of foundry grades for the first quarter. Recent sales include 1,000 tons of northern iron to a central Ohio manufacturer for the first half, and 500 tons of spot southern iron to a western melter. With freight rates $3.25, from Birmingham, and $1.20, from Ironton, we quote Cincinnati prices as follows:

Southern foundry No. 1	$17.75 to 18.25
Southern foundry No. 2	17.25 to 17.75
Southern foundry No. 3	16.75 to 17.25
Southern foundry No. 4	16.50 to 17.00
Southern gray forge	16.50 to 16.75
Mottled	16.25 to 16.75
Southern No. 1 soft	17.75 to 18.25
Southern No. 2 soft	17.25 to 17.75
Standard southern car wheel	31.00 to 31.50
Northern No. 2	17.95 to 18.20
Northern No. 3	17.45 to 17.95
Northern No. 4	17.20 to 17.70
Silveries 8 per cent silicon	20.20 to 21.20

Coke.—There has been a large amount of domestic coke sold in this territory recently, the demand being greater than for any other grade. Dealers state that they are selling all of it that they can secure, and that they have inquiries enough to continue to do so through the present year. The foundry coke situation is very strong, and small lots are continually being contracted for, sometimes at extremely high prices. We quote below from the leading coke producing districts, as follows:

	Prompt shipment.	Contract.
Connellsville district:		
Foundry coke	$4.25 to 4.75	$3.75 to 4.00
Furnace coke	3.85 to 4.25	3.00 to 3.50
Wise county district:		
Foundry coke	$4.00 to 4.25	$3.75 to 4.00
Furnace coke	3.50 to 4.00	3.25 to 3.75
Pocahontas district:		
Foundry coke	$3.75 to 4.00	$3.25 to 3.75
Furnace coke	3.25 to 3.75	2.75 to 3.00
New River:		
Foundry coke	$3.75 to 4.25	$3.25 to 3.75
Furnace coke	3.25 to 3.75	2.75 to 3.00

Finished Material.—The local sheet mill is still holding above the general market prices on both galvanized and black sheets, but is constantly booking new business, with deliveries to begin within from eight to 10 weeks from the date of sale. Specifications are coming in in satisfactory lots, a large part of the demand being from jobbers. Prices are as follows, Pittsburgh basis: Black sheets, No. 28 gage, 2.35c, and galvanized No. 28, 3.50c. There is no change in the steel bar and structural situation, most of the mills declaring that they are out of the market for any shipments before next summer. Prices are from 1.40c to 1.45c, on steel bars, and from 1.45c to 1.50c on structurals, Pittsburgh basis.

Warehouse business remains good, as the demand continues to exceed the stocks of some lines in dealers' yards, and these latter are very hard to replenish. No further advance in prices is expected before the first of the year, if then. We quote below warehouse prices, f. o. b. Cincinnati, as follows:

Steel bars, 2c to 2.10c base; iron bars, 1.95c to 2.05c base; structurals, 2.10c to 2.20c base; plates, ¼ inch and over, 2.10c to 2.20c base; sheets, blue annealed, No. 10, 2.25c to 2.35c base; rivets, cone head, 2.60c to 2.70c base; cold rolled shafting, 58 per cent discount; steel hoops, 2.10c to 2.20c base; full extras; boiler tubes as follows: 1½ inch, 46 per cent discount; 1¾ to 2¼ inch, 57 per cent discount; 2½ inch, 60 per cent discount; 2¾ to 3¼ inch, 65 per cent discount; 3½ to 4½ inch, 68 per cent discount; 5 to 6 inch, 60 per cent discount; soft steel cold twisted concrete bars, cut to length as follows: ¾ inch square and larger, 2.15c to 2.25c; ⅝ inch square and larger, 2.25c to 2.35c; ½ inch square and larger, 2.35c to 2.45c; 5-16 to ⅜ inch square and larger, 2.55c to 2.65c; and ¼ inch square and larger, 2.65c to 2.75c.

Old Material.—There are indications of a further weakening in the scrap iron market, which is expected about the latter part of the week. Prices have not changed in the past few days, but the larger consumers have notified the dealers that they will not pay as much in the near future as at the present time. The fact that pig iron quotations are showing a tendency to decline also has had a bad effect upon scrap iron prices. We quote prices dealers will pay and also dealers' selling prices in Cincinnati and vicinity as follows:

Gross Tons

Old iron rails	$14.00 to 14.50
Old steel rerolling	12.25 to 12.75
Old iron axles	18.50 to 19.00
Heavy melting scrap	12.25 to 12.75
Relaying rails	21.50 to 22.00
Bundled sheet scrap	9.25 to 9.75

Net Tons

Old No. 1 R. R. wrought	$11.50 to 12.00
No. 1 machinery cast	11.75 to 12.25
No. 1 busheling	9.75 to 10.25
Stove plate	8.50 to 9.00
Machine shop turnings	7.75 to 8.25
Cast borings	8.00 to 8.50
Heavy turnings	8.25 to 8.75
Mixed cast	10.25 to 10.75
Malleable	8.00 to 8.50

BUFFALO

Pig Iron Melters Urging Shipments

Office of THE IRON TRADE REVIEW,
Buffalo, Dec. 3.

Pig Iron.—The volume of placements was light during the week, but the demand upon the furnaces for shipments under contract continues to be very heavy, adding materially to the tonnage for November and the opening of the current month. Consumers, instead of coming into the market with fill-in orders, are urging the producers to ship at once on their forward delivery quotas. The November output of the stacks in the district was heavy, owing to a continuance of favorable operating weather. In some instances this condition permitted the furnaces to get out iron for some of their customers booked for January delivery.

Prices remain rigid. The coke situation has eased, making matters fortunate for some of the foundries who were not stocked ahead. Prices, f. o. b. Buffalo, follow:

No. 1X foundry	$18.00 to 18.25
No. 2X foundry	17.75 to 18.00
No. 2 plain	17.50 to 17.75
No. 3 foundry	17.25 to 17.50
Gray forge	17.00 to 17.25
Malleable	17.75 to 18.25
Basic	18.00 to 18.25
*Charcoal	18.25 to 19.25
*Some grades and brands	22.00

Old Material.—A moderate demand was all that materialized in the local market during the past week, resulting in the softening of prices noted below. What buying was done came from eastern Pennsylvania and the Pittsburgh district. The range for the week, for gross tons, f. o. b. Buffalo, is substantially as follows:

Heavy melting steel	$14.50 to 15.00
No. 1 railroad wrought scrap	15.50 to 16.00
No. 1 R. R. and mch. cast sc'p	13.75 to 14.25
Old steel axles	15.75 to 16.50
Iron axles	23.25 to 23.75
Car wheels	15.25 to 16.00
Railroad malleable scrap	13.50 to 14.00
Wr'ght iron and soft steel turn.	8.75 to 9.00
Cast iron borings	8.00 to 8.50
Low phosphorus steel scrap	16.75 to 17.25
Old iron rails	15.25 to 15.75
Tank iron	10.50 to 11.00
Boiler plate, sheared	14.75 to 15.25
Pipe and tank	10.25 to 10.75
Stove plate	11.25 to 11.75
Sheet iron	7.75 to 8.25
Locomotive grate bars	11.50 to 12.00

ST. LOUIS

Buying Confined to Small Lots

Office of THE IRON TRADE REVIEW,
St. Louis, Dec. 3.

Pig Iron.—Very little buying of pig iron is going on, except small lots for immediate shipments, and local agents are somewhat divided in opinion as to what constitutes the real market price. Some are quoting southern No. 2 at $14, Birmingham basis, for immediate shipment, and at $14.50 for first half of first quarter delivery, while others insist that the price should be $14 for spot, $14.50 for first quarter and $15 for first half. A sale of southern XX iron is reported to have been made last week at a little under $14, and another at $13.25, Birmingham, of 260 tons of 3 to 4 per cent silicon, but this in no wise represents the market. An offer of $13 for 1,000 tons of southern No. 2, Birmingham, for spot shipment, is said to have been promptly declined. The inquiry for 1,000 to 1,500 tons of 50 per cent silicon, which has been in the market for two weeks, has not been closed, but probably will be before the end of the present week. Another inquiry appeared this morning for 300 tons of southern No. 2, and still another for 400 tons of the same grade. A sale of 1,000 tons of basic iron, which was made about two weeks ago, came to light today. Other sales last week include 100 tons southern No. 2; 300 tons southern No. 2; one car 10 per cent silicon; 100 tons southern No. 2; 25 tons southern No. 2; 250 tons 12 to 13 per cent silicon; 100 tons southern No. 2; 25 tons southern No. 2; 500 tons 3 to 4 per cent silicon; 230 tons northern; 1,000 tons southern No. 2; 150 tons southern No. 2. Northern iron is firm at $18, Chicago furnace, and at $17, Ironton.

Prices on southern iron, delivered, to which the Birmingham freight of $3.75 has been added, follow:

Southern No. 1	$18.25 to 19.25
Southern No. 2	17.75 to 18.75
Southern No. 3	17.50 to 18.50
Southern No. 4	17.25 to 18.25

Finished Material. — Specifications against contracts for all grades of steel are heavy, and dealers report that they do not care to take on much new business. Steel bars are firm at 1.40c, Pittsburgh, and plates are 1.45c, Pittsburgh. No large contracts for structural steel are in sight.

METAL MARKETS

New York

Dec. 3.

Copper.—The first half of the past week developed no change in copper metal business. Consumers managed to hold off buying except where favorable opportunities occurred to secure metal at low prices. Some business of this character was done at around 17.50c, cash. During the past few days, however, a better demand has developed. Representative sellers claim to have booked some good orders at full prices; that is, at 17.75c, delivered 30 days, for electrolytic, and 17.87½c for lake. Second hands are still offering lots considerably under those levels, though. Custom house returns for November show the smallest aggregate of exports for any month during the past two years. The total is 19,146 tons. It is almost certain, however, that the Producers' statement of shipments for export will exceed that amount by several thousand tons. Since Dec. 1, 2,040 tons have been cleared at this port.

Tin.—Consumers have shown more confidence in the stability of prices the past week than for some time. A good volume of business was done, including contracts as far ahead as February. The best prices were recorded Monday, when sales were made at 50.10c for December delivery. Following a decline in London quotations of £1 5s the local market closed today at 49.75c for December, and 49.62½c for January. Domestic deliveries in November were larger than had been expected, amounting to 4,300 tons. Arrivals amounted to 3,214 tons, and stocks have decreased 1,086 tons.

Spelter. — Consumption keeps up well, but stocks are still plentiful at manufacturing plants, apparently, and recent sales have not been conspicuous in tonnage. Prime western is offered at 7.45c, in New York, and could probably be had for 5 points less.

Chicago

Dec. 3.

New Metals.—The market for new metals is easy on the whole, although copper remains firm with a slight upward trend.

We quote dealers' selling prices, f. o. b. Chicago, as follows:

Lake copper, carload lots, 17½c; casting, 17½c; smaller lots, ¼c to ¾c higher. Spelter, car lots, 7.35c; lead, desilverized, 4.40c; sheet zinc, 9c, f. o. b. Lasalle, in car lots of 600-pound casks; pig tin, 49.42½c; Cookson's antimony, 10½c; other grades, 9¼c.

Daily Average Production Record is Broken

Furnaces Averaged Daily Output of 87,827 Tons in November, Surpassing Mark Set Nearly Three Years Ago and Again Producing More Than 2,600,000 Tons

The record for the daily average production of coke and anthracite pig iron in one month, established nearly three years ago, was broken in November, when the blast furnaces in the country produced an average of 87,827 tons daily. The previous record was 86,748 tons, made in February, 1910,

HOW RECORD FOR DAILY AVERAGE PRODUCTION HAS BEEN BROKEN

September, 1909	79,186
October, 1909	84 001
November, 1909	84,425
December, 1909	86,539
February, 1910	86,748
November, 1912	**87,827**

1,079 tons less than last month. The record was surpassed despite the loss of several of the largest stacks. The daily average production in October was 86,569 tons, or 1,258 tons less than last month's figure.

The production in November fell short

AVERAGE DAILY PRODUCTION.

	1912.	1911.
January	66,220	56,989
February	72,372	63,617
March	77 791	69,863
April	79,254	68,163
May	80,753	60 367
June	81,125	59,109
July	77,502	57,294
August	80,650	61,995
September	81,482	65,797
October	86,569	67,486
November	87,827	66,637
December	.....	65,558

of the October output, due to the fact that there was one less day. In October, when all records for production were broken, there were 2,683,645 tons of pig iron made. Last month the output was 2,634,802 tons, a decline of 48,843 tons. It was the first time in the history of the American iron industry that more than 2,600,000 tons were made in each of two successive months and only the fourth time that that figure was surpassed.

There was more merchant iron made in November than in the preceding month, the loss in output being sustained by the non-merchant furnaces. The production of the merchant stacks in November was 716,715 tons, against 698,408 tons in October, a gain of 18,307 tons.

MONTHLY PRODUCTION.

	1912.	1911.	1910.
January	2,052,806	1,766,658	2,599,995
February	2,098,796	1.781,285	2,428,937
March	2,411,529	2,165 764	2,588,736
April	2,377,621	2,044,904	2,477,700
May	2,503,341	1,871 388	2,374,802
June	2,433,737	1.773,282	2,288,279
July	2,402,567	1,776,108	2,158,124
August	2,500,163	1.921,832	2,103,791
September	2,444,454	1,973 918	2,048.461
October	2,683,645	2,092,061	2,086,205
November	2,634,802	1,999 100	1,910,385
December	.....	2,032,301	1,779,899
Total	26,543,461	23,198,601	26,845,314

The steel works, or non-merchant furnaces, produced 1,898,411 tons last month, compared with 1,956,143 tons in October, a loss of 57,732 tons.

The number of furnaces in blast on the last day of November was 279, compared with 280 on the last day of October, a net loss of one. There were 11 stacks re-lighted last month and 12 put out of blast. The merchant furnaces showed a net gain of four in active stacks, seven being re-lighted and three blown out. Of the steel works, or non-merchant furnaces, four were re-lighted and nine were blown out, a net loss of five.

The output for the first 11 months of 1912 was 26,543,461 tons, surpassing by 5,377,161 tons the record for the corresponding period of 1911, when 21,166,300 tons of pig iron were produced. The establishment of a new record for production in one year is easily assured this year, as the production to December is only 301,853 tons below the entire output in 1910, the banner year. The output that year was 26,845,314 tons, and the production for 1912 will surpass that figure by more than 2,000,000 tons. The average monthly production so far this year was 2,413,042 tons, or at the yearly rate of 28,956,504 tons. The rapidly increasing rate of production during the past few months, however, makes an output of 29,000,000 tons practically a surety.

The production of spiegel in November was 5,248 tons, compared with 10,254 tons in October, a loss of 5,006 tons. The output of ferro last month was 14,428 tons, against 18,840 tons in October, a loss of 4,412 tons.

NOVEMBER PIG IRON.

States.	No. of stacks.	No. in blast last day of month. Nov.	Oct.	Total tonnage made. Merchant.	Non-Merchant.	——Totals—— Nov.	Oct.
Pennsylvania	159	112	120	205 368	866,381	1,071 749	1,124.770
Ohio	72	57	56	158,068	450,769	608,837	619,794
Alabama	45	22	21	113,182	54,428	167,610	158,834
Virginia	21	6	6	19,679	.....	19,679	16,930
New York	27	19	19	85,965	94,743	180,708	181.533
New Jersey	7	1	1	6,167	.....	6,167	5 370
Illinois	26	23	21	40,424	234,926	275,350	256,081
Colorado	6	3	3				
Indiana	10	10	10				
Maryland	4	3	2				
Wisconsin	6	4	3	16,164	172,917	189,081	193,049
Kentucky	7	3	2				
West Virginia	4	3	3				
Tennessee	16	9	9				
Washington	1	.	.	45,062	24,247	69,309	70,686
Georgia	2	.	.				
Texas	3	.	.				
Minnesota	1	1	1				
Michigan	3	3	3				
Missouri	1	.	..	26,636	.....	26,636	27,504
Spiegel—All states...						5.248	10,254
Ferro—All states....						14,428	18,840
Totals	425	279	280	716,715	1,898,411	2,634,802	2,683,645

LARGE CONTRACTS

For Blast Furnace and Other Work Taken by Best Mfg. Co.

The Best Mfg. Co., Pittsburgh, has taken a contract from the Youngstown Sheet & Tube Co., Youngstown, O., for power piping, valves, fittings and the construction work for a 500-ton blast furnace, six 100-unit open hearth furnaces, a complete blooming mill, condenser, turbines and boiler house. Specifications include high and low pressure steam, hydraulic, air and gas piping, valves and all necessary appurtenances to make complete equipment. The material will be delivered over a period of eight or nine months. The Best company also has taken a contract from the Indiana Steel Co., Gary, Ind., specifying a complete high pressure super-heat system for waste heat from 28 open-hearth furnaces to as many boilers. The system requires considerable piping. Other contracts recently taken by the Best company include one from the Republic Iron & Steel Co., Youngstown, O., for piping, covering all the work in process of completion; one from the Arizona Copper Co., Clifton, Ariz., for piping necessary for new smelters.

REFUSE TO LEAVE

Business Men Delighted With Rogers, Brown & Co. Pictures.

The auditorium of the Chamber of Commerce was filled at noon, Tuesday, by a representative body of Cleveland business men who listened with keen interest to the lecture of H. B. B. Yergason, representing Rogers, Brown & Co., as the moving pictures illustrating the story of iron and steel, "From Mine to Molder", were exhibited. The appreciation of the pictures was tested when at 1:30 p. m., the lights were turned on and all that wished to do so were given an opportunity to leave the hall to meet business engagements. Very few, however, took advantage of the opportunity, and nearly all stayed and joined in the final outburst of applause after the last picture had been displayed.

Mr. Yergason has now delivered this lecture and shown the pictures 32 times to audiences aggregating 38,000 people, and he is overwhelmed with applications from business organizations, colleges and others who are anxious to see the pictures. His itinerary already includes some of the leading colleges of the country.

The following were guests of Rogers, Brown & Co. at the luncheon which preceded the presentation of the pictures:

Chas. B. Wilson, Crispin Oglebay, Lester Sterling, Ferro Machine & Fdy. Co.
S. Rosenfeld, M. C. Rosenfeld, Grabler Mfg. Co.
Harry J. Hill, purchasing agent, Hill Clutch Co.
Norman Widlar, American Range & Fdy. Co.
F. A. Pope, Edward Pope, the Interstate Foundry Co.
N. S. Calhoun, J. C. Brainard, the Johnston & Jennings Co.
Geo. R. Ingersoll, L. S. & M. S. R. R.
Mr. Ryan, Mr. Sweeney, the Allyne-Ryan Co.
M. W. Merriman, Geo. Walton, the Madison Foundry Co.
P. D. Crane, the Meech Fdy. Co.
E. L. Whittemore, C. W. Hotchkiss, the National Mall. Castings Co.
John Trenkamp, G. C. Gagen, the Ohio Foundry Co.
Geo. G. Stein, Harwood Wilson, Rogers, Brown & Co.
D. T. Croxton, S. W. Croxton, C. B. Smith, the Cleveland Furnace Co.
George Bartol, J. E. Touch, the Otis Steel Co., Ltd.
W. B. Greene, the Palmers & DeMooy Fdy. Co.
Lyman H. Treadway, the Peck, Stow & Wilcox Co.
Chas. A. Brayton, the Standard Car Wheel Co.
Anthony Carlin, Standard Fdy. & Mfg. Co.
C. M. Miller, Geo. Feiss, Superior Fdy. Co.
B. F. Wade, C. J. Morgan, H. J. Boggis, Taylor & Boggis Fdy. Co.
H. R. McKnight, W. S. Tyler Co.
Geo. B. Thomas, U. S. Cast Iron Pipe & Fdy. Co.
J. W. Osborn, Walworth Run Fdy. Co.
William N. Sawyer, David P. Ballard, Wellman-Seaver-Morgan Co.
J. D. Cunningham, National Car Wheel Co.
Fred L. Prentiss, The Iron Age.
John Chandler, Lackawanna Steel Co.
R. J. Frackleton, Chandler-Price Co.
Henry Moulder, Best Foundry Co.
H. H. Hammond, McMyler-Interstate Co.
B. D. Fuller, Mr. Brown, Westinghouse Electric & Mfg. Co.
George Smart, THE IRON TRADE REVIEW.
James C. Wallace, Robert B. Wallace, American Ship Building Co.
Henry Born, the Born Steel Range Co.
J. A. Hurt, Atlantic Foundry Co.
W. C. Bruce, J. H. Bruce, the Bowler Foundry Co.
V. M. Moore, the Chisholm & Moore Mfg. Co.
John H. O'Brien, Cleveland Co-Operative Stove Co.
W. D. Sayle, Wm. F. Swift, the City Foundry Co.
F. H. Jackson, Duplex Foundry & Mfg. Co.
Wm. Greenbaum, the Acme Foundry Co.
W. P. Champney, the Eberhard Mfg. Co.
J. R. Raible, the Fanner Mfg. Co.
C. F. Seelbach, Wm. Strangward, the Forest City Fdy. & Mfg. Co.
A. M. Ober, the Ober Mfg. Co.

REPORT OF EARNINGS

For Past Nine Months Issued by Bethlehem Steel Co.

The Bethlehem Steel Corporation has issued a report, including its subsidiary companies, to the New York stock exchange, as to the business for the nine months ended Sept. 30, last,

Net manufacturing profits	$3,009,215
Other income	228,631
Total income	3,237,846
Interest and other charges	1,501,088
Net income	1,736,759

This compares with a net income before depreciation of $2,713,979 for the 12 months ended Dec. 31, 1911.

DIXIE'S FOUNDRY

Was Factor in Causing Decision for Another Tender.

The numerous advantages of the open-air foundry on the hurricane deck of the Dixie indirectly caused congress to authorize an appropriation for another naval tender, Commander J. K. Robinson, of the "mother ship", told foundrymen at the regular monthly meeting of the Pittsburgh Foundrymen's Association, held at the Fort Pitt hotel, Dec. 2. Immediately after the foundry and machine shop of the Dixie had been inspected, the appropriation was allowed.

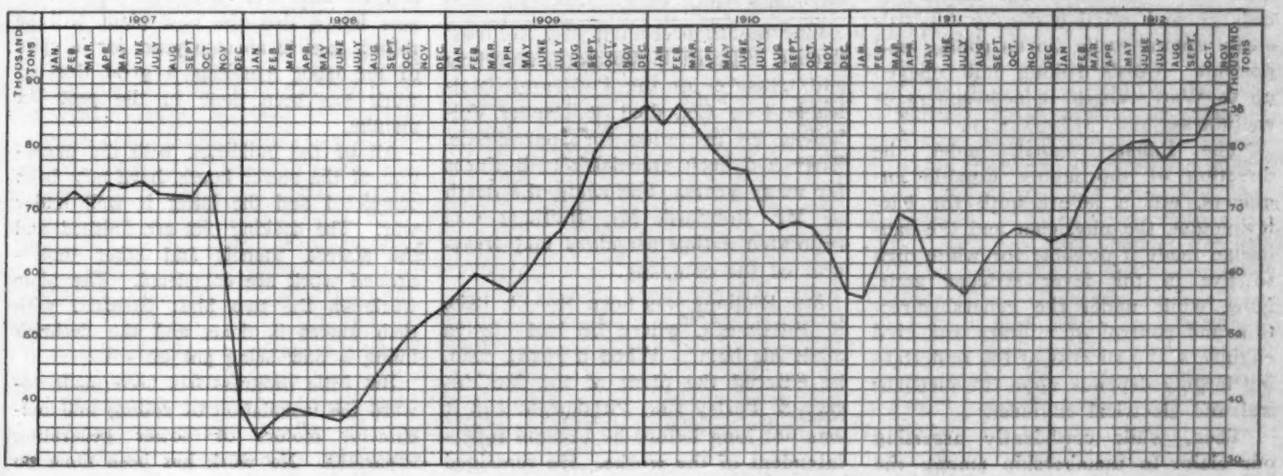
Commander Robinson described the Dixie from stem to stern and told of the part she would take in time of conflict. He gave an interesting account of the vest-pocket edition of the ship's foundry and machine shop and said the Dixie had the greatest mechanical supply department in the world. Sailors employed in the foundry and machine shop do not work on the shoremen's eight-hour schedule.

Commander Robinson said, "the eight-hour day doesn't go with us; sometimes men work 24 hours a day at a double-paid gait."

About 75 foundrymen heard the talk.

Ella Will Resume.—The Ella furnace of Pickands, Mather & Co., at West Middlesex, Pa., will be blown in Jan. 1 and will run continuously on foundry and malleable irons, making the old grades of Ella soft and Ella strong that have been made in past years.

The Montgomery Elevator Co. building, two stories, 113 x 117, Moline, Ill., will be completed by Feb. 1.



DAILY AVERAGE OUTPUT OF COKE AND ANTHRACITE PIG IRON

FIRST SESSION

Of A. S. M. E. Held Last Night in New York City.

New York, Nov. 4. (By wire.)—The formal opening of the thirty-third annual meeting of the American Society of Mechanical Engineers took place with a professional session at the Engineering Society's building last night. Alexander C. Humphreys, president of the society, delivered the annual address, discoursing on "The Present Opportunities and Consequent Responsibilities of the Engineer." President-elect Dr. W. F. M. Goss was tendered a stirring reception when he also addressed the society. On concluding his address, President Humphreys said:

"There appears to have been a tendency, not so apparent at present, to deny to the mechanical engineer the professional position more readily conceded to the civil and mining engineer. This seems unreasonable and indefensible when we study the question and are forced to endorse Holley's claim that mechanical engineering underlies all engineering. The reason for this rather intangible discrimination is in part due, I believe, to that fact that so many of the rank and file of our department of engineering are engaged in working out the details, more or less important, of undertakings which are under the general direction of civil or mining engineers or others not members of our profession. Many mechanical engineers thus become absorbed in the invention and development of mechanical devices, possibly of vital importance in the general scheme, and so fail to take a grasp of the undertaking as a whole.

"The question of precedence need not be raised; there is credit enough for all. As engineers we are committed to the doctrine of efficiency. Efficiency must come from co-operation, not from discussions as to precedence and relative dignity. Watt's steam engine made Cort's rolling mill possible. Cort's rolling mill opened up to Watt's engine a new sphere of usefulness.

"The Panama canal, under the direction of thoroughly capable engineers, was a failure until the bacteriologist, the physician and the sanitarian made it possible for white men to live in the fever stricken zone. Now, while under the general direction and control of military and civil engineers, the success of the undertaking largely depends upon the mechanical and electrical engineer.

"Then, while confidently asserting our claim to membership among the liberal professions, and accepting to the full the responsibilities which are thereby involved, let us be prompt to recognize that the progress of the world, material and ethical, depends upon the unselfish, intelligent and devoted co-operation in service of all professions and vocations under the leadership of men of vision, intellect, power and humanity."

Death of George Rollings

George Rollings, one of the best known foundrymen in the Pittsburgh district, and superintendent of the Pittsburgh Malleable Iron Co., died Nov. 30, at his home, 64 Warren street, Crafton, Pa., after a comparatively short illness. Death was due to a complication of diseases. The end came as a surprise, although Mr. Rollings had been in poor health for some time. He was able to attend to his duties with the Malleable Iron company, however, until the Wednesday before his death.

THE LATE GEORGE ROLLINGS.

One month preceding Mr. Rollings' demise, Edward P. Botsford, secretary and treasurer of the Pittsburgh Malleable Iron Co., died at Denver, following an operation for appendicitis. They had been associates in business for many years. Following the death of Mr. Botsford, Mr. Rollings was appointed acting secretary and treasurer of the company.

Mr. Rollings was born Nov. 1, 1856, in Pittsburgh, where he had always made his home. When a young man, he entered the plant of the McConway & Torley Co., Pittsburgh, and it was not long before he became superintendent of the works. He remained with the McConway & Torley company until he organized the firm of George Rollings & Co., which later became known as the Pittsburgh Malleable Iron Co.

Although primarily a malleable iron man, Mr. Rollings' interests were not confined to a single field. He was connected, in an official way, with the First National Bank, of Crafton, and the First National Bank, of Bridgeville, Pa. Much of his time was devoted to charitable and religious work. Mr. Rollings was a vestryman in the Episcopal church, at Crafton, and took an active interest in several of the charitable institutions of the city.

Eight of his closest friends and business associates acted as pall bearers at the funeral, held Tuesday, Dec. 3. Pall bearers were: W. A. Forrester and Samuel Sleets, purchasing agent and superintendent of foundries, respectively, of the Westinghouse Airbrake Co.; Jos. Schneider and Robert Stewart, of the Pittsburgh Malleable Iron Co.; John M. Heany, cashier of the First National Bank of Bridgeville; H. H. Johns, cashier of the First National Bank of Crafton; Robert Taylor and John W. Spalter, two of his warm companions.

Mr. Rollings was married in 1883 to Miss Jennie Sproul. Besides the widow, two daughters, Mrs. Bradley Gibson and Miss Maude Rollings, survive.

PROGRESS MADE

In Spite of Labor Shortage at Minnesota Steel Co. Plant.

Duluth, Minn., Dec. 2.—Progress in the construction of the new plant which the Minnesota Steel Co., a subsidiary of the United States Steel Corporation, is building at Duluth, has been hampered by a shortage of labor and with the approach of severe winter weather it is expected that the difficulty in obtaining and holding men will increase. It is now hoped that the new plant will be rolling steel in about a year, for in spite of the labor handicap, a great deal of work has been done in the past six months.

All of the buildings, with the exception of the power house, have now been completed and the latter is well under way. The soaking pits are finished and the sewers, tunnels and other underground work are completed. The plate work on the two blast furnaces with their stoves is done, and the firebrick lining is now being put in.

But little progress has been made toward the installation of rolling mill machinery, motors or power generating apparatus. No work has been done on the coke ovens.

A Memorable Visit to Sir Henry Bessemer

The Original Letter Regarding Sale of Bessemer Rights

By S T Wellman

At a recent meeting of the Cleveland Engineering Society, of Cleveland, S. T. Wellman recounted a visit he had made about 20 years ago, in company with Andrew Carnegie, to the home of Sir Henry Bessemer, and he related, in part, his interview with the inventor of the process which revolutionized the world's steel-making industry. An exceedingly interesting letter, written in 1865 by Bessemer & Longsdon to Winslow, Griswold & Holley, referring to the sale of the Bessemer patents in the United States, also is reproduced. It will be noted that the owners of the basic patents "are very glad indeed to find that you (Winslow, Griswold & Holley) have such good hopes of getting over Mushet's interference and also of doing without his plans." Fortunately for Sir Henry Bessemer, the Mushet patents were allowed to lapse and the use of carbide of manganese became public property. Robert Mushet realized practically nothing from his patent, although his suffering in his declining years was ameliorated by an annual pension of 300 pounds paid by Bessemer.

The work of Kelley and Shunk in this country was disturbing to Bessemer & Longsdon, as they state that "we hope that Kelley and Shunk may soon be disposed of satisfactorily to you. We think you will certainly be able to confine those gentlemen in very restricted limits, if you do not succeed in beating them altogether."

Manufacture of Tires

Reference also is made to the difficulty experienced by the prospective purchasers of the American rights, in the manufacture of tires. The process pursued in England was outlined in great detail, and to make the tires soft and tough, an improved alloy of manganese and iron was used, which contained about 20 per cent of manganese. The letter concludes with best wishes for a safe journey through the legal entanglements which beset the establishment of the validity of the Bessemer patents in this country.

An elapse of about 20 years failed to dull the memory of S. T. Wellman's charming visit to Sir Henry Bessemer and every detail of this notable event is clearly outlined in the following narrative:

"About 20 years ago, while crossing the Atlantic, I happened to be on the same ship with Andrew Carnegie. Shortly before landing he asked me if I would not like to meet Sir Henry Bessemer. I answered that nothing would please me better. 'Well,' he said, 'within a few days after we reach London, I will try to arrange for it," which he did by making an appointment with Sir Henry to come out to his residence at Denmark Hill, in the suburbs of London; so one morning we drove out there, and spent several hours with him.

"Sir Henry Bessemer was a tall, fine looking man, a typical Englishman and a good talker, who liked nothing better than to talk about the early history of the steel business. He first took us around the grounds, which were very large, containing 30 or 40 acres.

Bessemer's Estate

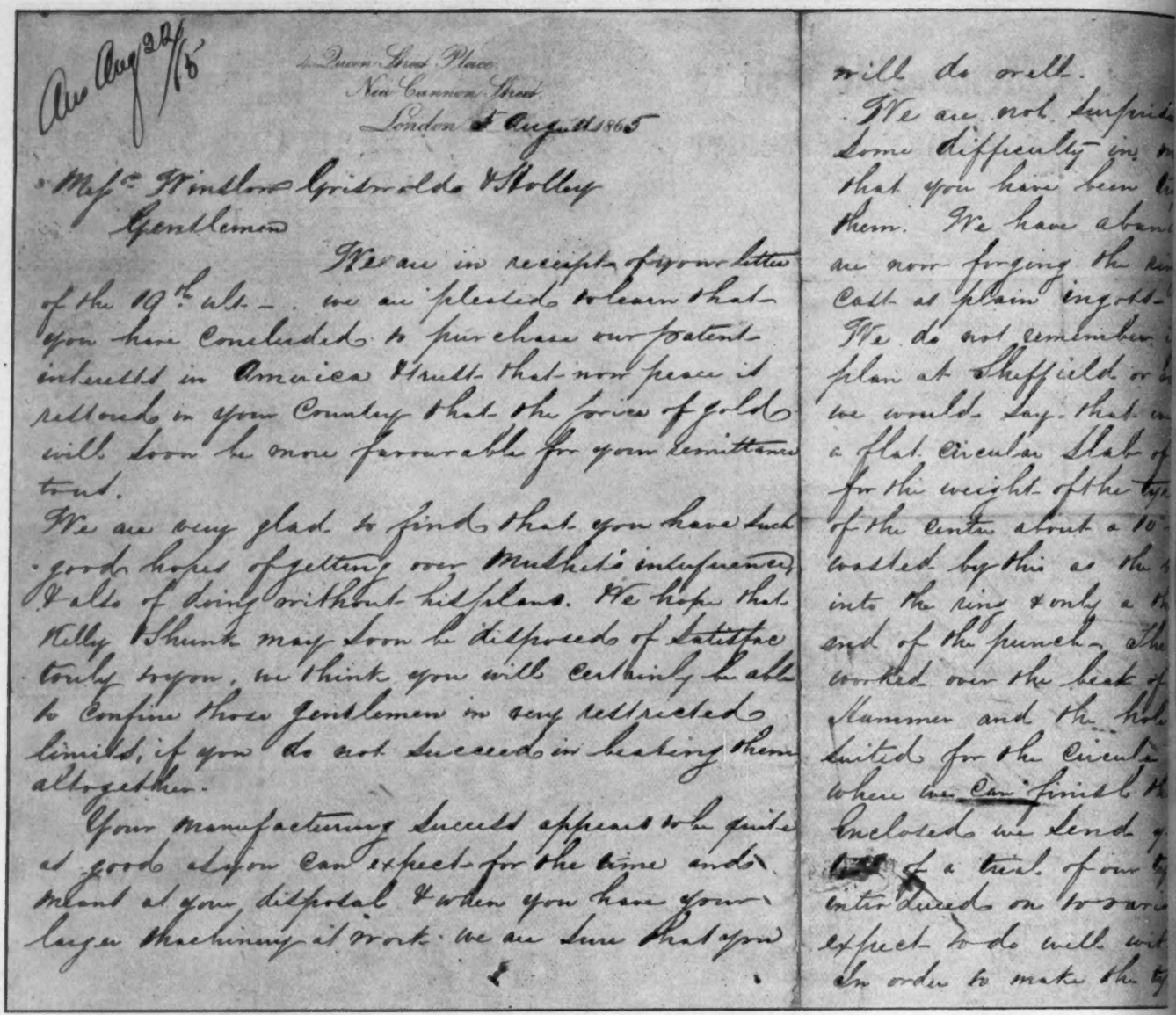
"I cannot better describe the place than by copying the following from a London paper:

"'From the terrace of Sir Henry Bessemer's house the distant view is singularly pleasing and essentially English in its unhidden sylvan character. The foreground of the picture is almost entirely manufactured. Its natural slope toward the valley is perhaps generally maintained, but hills have grown where there were depressions, rocks have sprouted forth where there was nothing but gravel, and a lake with its feeder and outlet forms part of the purely artificial river system. Beyond the superbly terraced lawns is a sweet bit of real nature, a meadow, in which the tall rye grass, buttercups, and ox-eyed daisies wave at every puff of wind, making the rich carpet red, yellow and white by turns. At the lower side of this flat meadow is a bowling green, level as a billiard table, and separated from it by a rim of ground ivy, next to which comes a triumph of landscape gardening—a great clump of rhododendrons on the rocky shore of the picturesque lake. Around the lake are thick shrubberies, in which hawthorn, jasmine, and honeysuckle contend with the lilac, laburnum, laurel and innumerable rhododendrons. Presently the host vanished in a bush as if by pantomimic trick, and in a moment reappears and leads the way into a cavern filled with a magnificent collection of ferns, heated to the precise temperature, and lighted by a skillful combination of toplights and mirrors. At one extremity of this

S. T. Wellman

Samuel Thomas Wellman, mechanical and metallurgical engineer, Cleveland; born in Wareham, Mass., Feb. 5, 1847, and educated in the public schools of Nashua, N. H., and Norwich University, Norwich, Vt. Chief engineer and superintendent Otis Iron & Steel Co., Cleveland, 1873 to 1889; president Wellman Steel Co., 1890 to 1895; chairman of the executive board of the Wellman-Seaver-Morgan Co. and one of the organizers of the Electric Controller & Mfg. Co., Cleveland; past president of the American Society of Mechanical Engineers and inventor of numerous labor-saving devices employed in steel manufacture. Recently Mr. Wellman has made experiments in California on the electric smelting of iron ore and is engaged at present in consulting engineering work.

SIR HENRY BESSEMER



Rec'd Aug 22/65

4 Queen Street Place
New Cannon Street
London 5 August 1865

Messrs Winslow Griswold & Holley
Gentlemen

We are in receipt of your letter of the 19th ult — we are pleased to learn that you have concluded to purchase our patent interests in America & trust that now peace is restored in your Country that the prices of gold will soon be more favourable for your remittance to us.

We are very glad to find that you have such good hopes of getting over Mushet's interference & also of doing without his plans. We hope that Kelley & Shunk may soon be disposed of satisfactorily to you, we think you will certainly be able to confine those gentlemen in very restricted limits, if you do not succeed in beating them altogether.

Your manufacturing success appears to be quite as good as you can expect for the time and means at your disposal & when you have your larger machinery at work we are sure that you will do well.

We are not surprised that you have found some difficulty in making tyres. We presume that you have been trying to cast the rings for them. We have abandoned the casting & are now forging the rings out of the solid metal cast as plain ingots.

We do not remember if your Mr. Holley saw this plan at Sheffield or not, but in case he did not, we would say that we first hammer out of an ingot a flat circular Slab of the size & thickness required for the weight of the tyre of the centre about a 10 — cooled by this as the [illegible] into the ring & only a th[illegible] end of the punch — The [illegible] worked over the heat of [illegible] Hammer and the hole [illegible] suited for the Circular [illegible] where we can finish th[illegible] Enclosed we send y[illegible] of a trial of our ty[illegible] introduced or to any[illegible] expect to do well wit[illegible] In order to make the ty[illegible]

REPRODUCTION OF THE ORIGINAL LETTER WRITTEN IN 1865, WHICH REFERS TO

cave, lined with rocks made of brick and cement, is a waterfall pouring over a glass wall; at the other a snug little smoking room, looking over the lake, with all necessary refreshments hidden behind a rock, apparently as massive as a cheese ring, and of nearly the same outline.'

"The walls of these rooms, as well as the hill itself, were built of a great variety of stone. Sir Henry told us with a great deal of glee of the visit, not long before, of a celebrated geologist, who, when shown the caves and rooms, was delighted to see such a collection of rocks and was able to tell his host exactly what part of the world many of them came from, but was very much nonplused and could hardly believe him when Sir Henry told him that they were all artificial.

"After wandering around the beautiful grounds as long as we wished, we were invited into the library, and were

LETTER REFERRING TO THE SALE OF THE

4 Queen Street Place, New Cannon Street, London, August 5, 1865

MESS. WINSLOW, GRISWOLD & HOLLEY,

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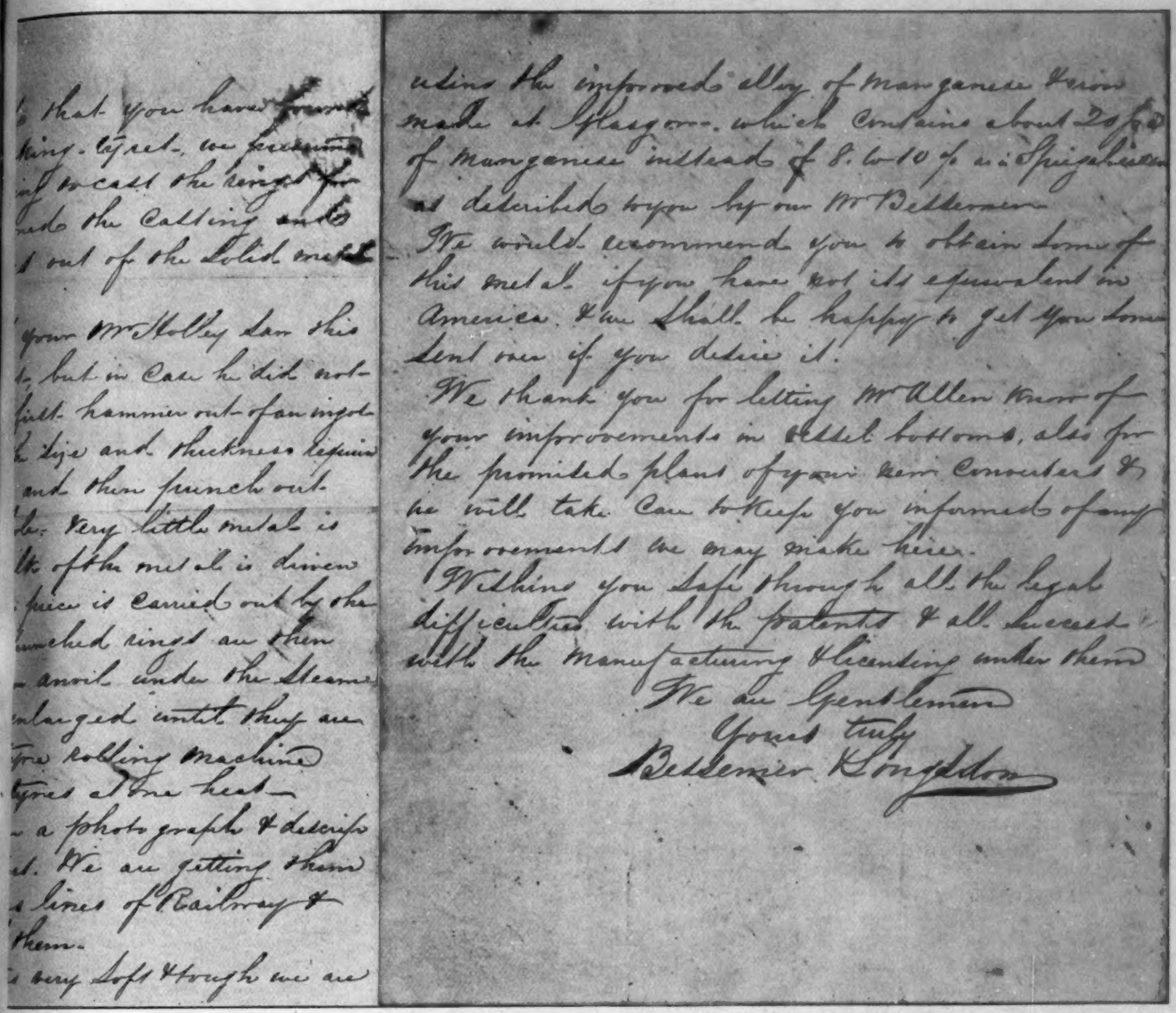

...that you have found ...ring. Lyset. we presume ...if to cast the rings for ...ods the calling and ...t out of the solid metal

...your Mr Holley can this ...to but in case he did not ...fully hammer out an ingot ...he size and thickness required ...and then punch out ...the very little metal is ...lth of the metal is driven ...piece is carried out by the ...unched rings are then ...anvil under the steam ...enlarged until they are ...ire rolling machine ...tyres at one heat ...a photo graph & descrip... ...et. We are getting them ...s lines of Railway & ...them.

...any soft & tough we are using the improved alloy of manganese iron made at Glasgow. which contains about 20 p.c. of manganese instead of 8. to 10 p.c. in Spiegeleisen as described to you by our Mr Bessemer.

We would recommend you to obtain some of this metal if you have not its equivalent in America. & we shall be happy to get you some sent over if you desire it.

We thank you for letting Mr Allen know of your improvements in vessel bottoms, also for the promised plans of your new converters & he will take care to keep you informed of any improvements we may make here.

Wishing you safe through all the legal difficulties with the patents & all success with the manufacturing & licensing under them

We are Gentlemen
Yours truly
Bessemer & Longsdon

THE SALE OF THE AMERICAN RIGHTS TO THE BESSEMER PROCESS OF STEELMAKING

AMERICAN RIGHTS TO BESSEMER PROCESS

the tyre and then punch out of the center about a 10-inch hole. Very little metal is wasted by this as the bulk of the metal is driven into the ring and only a thin piece is carried out by the end of the punch. The punched rings are then worked over the beak of an anvil under the steam hammer and the hole enlarged until they are suited for the circular tyre rolling machine, when we can finish the tyres at one heat. Enclosed we send you a photograph and description of a trial of our tyres. We are getting them introduced onto various lines of Railway and expect to do well with them.

In order to make the tyres very soft and tough, we are using the improved alloy of manganese and iron made at Glasgow, which contains about 20 per cent of manganese instead of 8 to 10 per cent, as in spiegeleisen as described to you by our Mr. Bessemer.

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Wishing you safe through all the legal difficulties with the patents and all success with the manufacturing and licensing under them,

We are, gentlemen, Yours truly,

BESSEMER & LONGSDON

entertained for two or three hours by Mr. Bessemer with his history of his early experience in the manufacture of steel.

First Steel Experiment

"He explained that the reason he was first induced to think of an experiment with a new process of iron-making was the knowledge which came to him that the French emperor, Louis Napoleon, was seeking a material to make better artillery than was then in use. Bessemer's first idea was that he could make an improved wrought iron by blowing air through the liquid iron instead of stirring it with a rabble to bring it in contact with metallic oxides, as was the practice in the puddling furnace. To carry out this idea, he constructed a small, stationary converter of fire brick. This was about 3 feet inside diameter and considerably more in height. The pipes or tuyeres entered at

the side not much above the bottom. They were all connected with the blast box which encircled the converter—a pipe leading from this to the blowing engine.

"The converter was covered and a hole in the side near the top was left as an outlet for the flame. When it was finished, he sent to the iron store for *a ton of pig iron*— no other specification. Any old thing would do, so long as it was pig iron. Here was Bessemer's lucky day. He knew nothing at that time about the chemistry of iron or what composition was necessary in the iron to make good steel. So it was pure chance that it so happened that the iron sent to fill his order was the only brand, Blaenavon, made in all Great Britain at that time that would have made good malleable steel under the conditions by which it was made. It was low in phosphorus and sulphur, high in silicon and contained a little manganese. So the first trial was successful in making a metal which, when tried in a neighboring iron works, rolled and hammered successfully. The bars were treated in many ways, both hot and cold, and proved to be so strong and tough that it created a great deal of interest in all who saw it.

"Mr. Bessemer said that if the steel had been made from any other brand of iron made in Great Britain, that the result would surely have been such a worthless metal, brittle and rotten at all temperatures, that he would have abandoned the experiment at once. Surely it was a lucky chance that sent him to that iron dealer.

Bessemer Patents

"Bessemer immediately took out patents on the process and as the British society met soon after at Cheltenham (this was in 1856), he prepared a paper on the new process, which was read, and exhibited his samples. The paper created a great deal of excitement among the iron makers present, so much so that before the meeting closed he sold shop rights to the five leading iron works of England, for the sum of £10,000 each, and went back to his home with the cash. As I have said before, very little was known of the chemistry of iron and absolutely nothing of steel.

"As soon as possible all of the licensees of the new process built converters at their own works and tried to make steel from their own iron, but every one of the experiments was a dismal failure, and not a pound of malleable steel could be made. It was, of course, a great surprise to every one, including Mr. Bessemer. He was branded as a trickster and thief, and every effort was made to get the money back, but he was not the kind of man to do that. He knew that there must be a reason why one kind of pig iron would make good steel and another brand would not, and he determined to find out the reason, but it would take time and money to do it. Luckily he now had both; so he went to work. He found a chemist who thought he could work out a method for finding the composition of the various samples. He succeeded in demonstrating that the good steel was low in phosphorus and sulphur, while the bad was very high in both these elements.

Low Phosphorus Iron

"Mr. Bessemer kept all this knowledge to himself, and went quietly to work to build a small converting plant with which to experiment and to demonstrate the process. Meanwhile, he went to work with the help of some friends to buy back the shop rights which he had sold, as he had formed very much higher ideas as to the value of his process than at first. This he succeeded in doing, paying for one right £10,000 and for another £20,000, or twice as much as he had received. When his experimental plant was ready, he made a journey to the West Cumberland district to arrange for some iron. The ores from which the first iron he had used was made had come from there, and he had discovered that it and the West Cumberland ores were low in phosphorus, so he ordered some iron made from that ore. It was duly received at the works and the first steel in the new plant was made, but very much to his surprise it was no better than that made by his licensees. Then he had the iron analyzed and found it high in phosphorus. He could not understand how this could happen when the ore was so free from this bad element; so he journeyed back to the West Cumberland furnace, to find the trouble, if possible.

"In walking around the plant with the manager, he came across a large pile of black rock or other mineral, and asked what it was. The manager told him that it was the flux he used. Well, what was it? Why, it was puddle furnace cinder; this, he knew, must contain a large percentage of phosphorus; he had found the cause of the trouble, sure enough. 'Why do you use it?' he asked. 'Why, to make the furnace work smooth and the iron fluid.' The result of the visit was an order for more iron to be made from straight ore with no puddle sinder. The order was filled and was billed as Bessemer iron—a trade name, which it bears to this day.

"The next experiment was successful and the steel turned out was all right in every respect and fully as good as the first trial—the samples from which were shown at Cheltenham. It was now comparatively smooth sailing for the new works and he was soon able to demonstrate that he could make uniformly good steel that was strong and tough, hot or cold; also, steel of any carbonization desired, hard or soft. His old friends, from whom he had bought back the licenses, then came and demanded them back, but he said no, the process was much more valuable than he at first supposed and he had decided not to sell any shop rights, but would license any one to use the process for a royalty of £1 sterling per ton for rails, £2 for all other work. This royalty he insisted on, and it was paid by all users of the process in England during the life of the patent.

"The process very soon came into general use, as the trade was ripe for it. It was just what was wanted, particularly for rails. The old wrought iron rails were very poor and the Bessemer steel rail filled a long felt want; without it the great railroads of the world would be almost impossible. The first rail was laid at the Crewe station of the London & Northwestern railroad and wore out 23 iron rails.

Rivalry of Mushet

"Bessemer soon found that manganese was necessary in the iron to make the steel malléable when hot in rolling or hammering, but the process of adding a carbide of manganese to this mixture was the idea of another inventor, Robert Mushet, who thus became a rival of Bessemer, and as Mushet sold an interest in the patent to one of the iron companies which was trying to get back the shop right which it had sold back to Bessemer, this was used as a lever to demand a very large royalty from Bessemer for the use of the manganese patent. Through this a great deal of bad feeling was worked up between Bessemer and Mushet. The handling and caring for Mushet's patent was left by him to one of his partners, and he, by some oversight or negligence, allowed the patent to lapse by a failure to pay the annual fees when due;

so, very much to Bessemer's surprise and joy, he learned one morning that this had happened, and that Mushet's patent was public property; that he as well as all others were free to use it. Bessemer's process was useless without Mushet's invention, and Mushet ought to have made a fortune out of it, but he made nothing and died a poor man.

"Several years after the lapsing of Mushet's patent, one evening there was a knock at Mr. Bessemer's door. On opening it the servant found a young woman, poorly dressed, who asked to see Mr. Bessemer. She was shown into the library and introduced herself to Mr. Bessemer as the daughter of Mr. Mushet. She said she had heard that he was a kind-hearted man; she had come of her own free will to tell him that her father and his family were very poor and suffering for the necessities of life; she knew that by the aid of her father's invention he was being helped to make a great deal of money, and she thought that perhaps he would help them in their great need. The result of this appeal was that Mr. Bessemer during the remainder of Mr. Mushet's life paid him a pension of £300 per year, thus proving the truth of what the daughter had heard. It certainly was a noble act.

Mecca For Steelmakers

Bessemer's model works soon became the mecca of the iron men of England, for here were worked out all the early problems of Bessemer steelmaking. The stationary converter was soon abandoned for the tipping converter, mounted on trunnions, with a removable bottom, in which were placed the fire clay tuyeres. Except in some minor details, this beautifully simple piece of apparatus has remained unchanged for 50 years. The works in Sheffield still are in operation under the name of Henry Bessemer & Co. He made a large fortune from the royalties acquired in England, but comparatively little from the rest of the world.

"For many years more steel was produced by the Bessemer process than all others put together, but now the basic open-hearth has passed it in tonnage, and it would seem that the day was not far distant when, as A. L. Holley used to predict, the open-hearth would go to the funeral of the Bessemer process. The reason for this is not hard to see. The acid Bessemer process must have pig iron low in phosphorus and sulphur, high in silicon, with very close limits; the basic Bessemer must have high phosphorus, low sulphur and silicon. The particular kinds of ores necessary to make these kinds of iron are getting more scarce every year.

"While for the basic open-hearth only low silicon is essential, phosphorus and sulphur can be removed by the process and much lower phosphorus and sulphur be left in the finished steel than is found in the average Bessemer.

"In several works in this country, a process is in use in which high silicon pig iron, also high in phosphorus, is used; most of the silicon and carbon are blown out in the Bessemer converter, the metal being then removed to an open-hearth furnace, where the phosphorus and sulphur and the remainder of the carbon are removed and the steel finished.

Bessemer a Versatile Inventor

"Bessemer was a very versatile inventor, but the bulk of his fortune was made from his steel process. The patent for this expired in 1870. During its life he received in royalties over £1,000,000 sterling. Very seldom has an inventor been so well rewarded for an invention.

"One invention of his was 'Bessemer gold powder', the method of manufacture of which he did not patent, but kept a secret. Only four or five workmen were employed, as the machinery was automatic. After he had made his fortune from steel, he gave the gold powder business outright to the two leading workmen who had grown old in his employ.

"He was an inventor of several patents on sugar mill machinery, also for a system of furnaces using combustion under very high pressure. He spent a great deal of money on this, but nothing came of it.

"He only left England on one occasion, when he crossed the channel to France. He was so terribly sick that he came near dying, but this set him to working on an idea for a steady cabin steamer. Thousands of pounds were spent in building a very large boat embodying his idea, but it was a failure and was broken up. If this had been a success he said he would have visited America, but much as he desired to come, he did not dare to take the risk.

"He was always busy at something new. At the time of our visit he was working on a solar furnace, using a large number of 24-inch lenses. The rays of the sun coming through were concentrated in a small furnace, resulting in a tremendous temperature. I never heard the result of this experiment.

"I bid good-bye to our host with regret and shall never forget the visit. I never saw him but once again, just for a few moments, in London."

Nearly Nine Billion Tons of Coal Mined

In 1814 the total amount of coal produced in the United States was 22 short tons, all of it anthracite; the next year 50 short tons were mined; the next year, 75 short tons; and in 1819 the total quantity mined was 350 short tons. There was a remarkable increase, however, in 1820, when 3,450 short tons were mined, and two years later the quantity was 58,583 short tons, due to the entrance of Virginia in the field, with an output of 54,000 short tons of bituminous coal. From that time coal mining increased with leaps and bounds, so that at the close of the first 50 years of the industry the output was 23,605,123 short tons. This figure, however, will be considered remarkably small when it is noted that the output of the mines of the United States in 1900 was 269,684,927 short tons. The largest annual output so far recorded was that for 1910, which was 501,596,378 short tons. In 1911 the total amount of coal produced was 496,221,168 short tons. The anthracite coal industry has increased from 22 short tons in 1814 to 90,464,067 short tons in 1911, the largest quantity yet recorded. The total amount of anthracite coal produced since 1814 is 2,270,798,737 short tons. The total amount of bituminous coal produced by American mines since the beginning of the industry is 6,468,773,690 short tons, and the total production of both anthracite and bituminous coal is 8,739,572,427 short tons. These figures are quoted from a chart recently issued by the United States geological survey showing the production of coal in the United States from 1814, the date of the earliest record, to the close of 1911.

The Metallic Packing & Mfg. Co., Elyria, O., is now manufacturing a metal packing, in addition to its other types, for the water ends of pumps, in which no fibrous material comes in contact with any moving part and which has no adjustable gland to cause an increase of friction. The friction problem, as relating to packings, has been carefully investigated by many engineers and the new packing now offered to the trade is the result of some of these investigations.

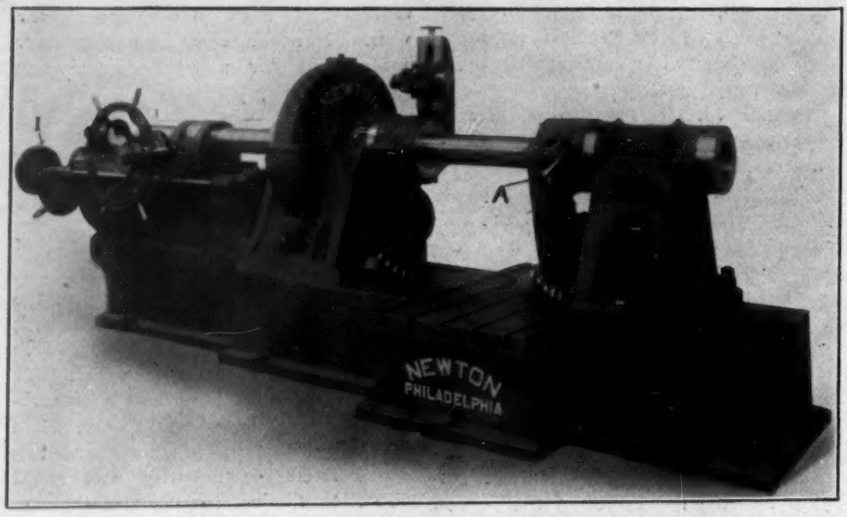


FIG. 1—OPERATING SIDE OF NEWTON CYLINDER BORING MACHINE

Newton Cylinder Boring Machines

The Newton Machine Tool Works, Inc., Philadelphia, recently has redesigned its entire line of cylinder boring machines, which are adapted to boring motor frames, cylinders and similar parts. The operating side of one of these machines is illustrated in Fig. 1, and Fig. 2 shows the driving side with the base for the motor. However, this machine can be arranged for belt drive if desired. The spindles are driven by a worm and worm wheel and the spindle sleeves are extended to receive the facing arms, which can swing idle when the boring bar rotates. The clamping of the facing bars is effected by the lever *A*, Fig. 1, which is attached to the eccentric clamp. The toolholder is adjusted by hand for varying depths of cut and is attached to the face of the arm. An in-and-out hand adjustment also is provided for cuts of only slight depth. The feed to the spindle is controlled by a trolley and the feed is actuated by a gear, *B*, Fig. 2, attached to the end of the spindle sleeve, through the shaft, *D*. The different rates of feed are obtained through the gears on the spline shaft, *i*, Fig. 1. These gears always are in place and the engagement of different gears is effected by mounting the intermediate gears on the swing arm. The frame is of heavy box type construction, the work table being cast solid with the base, although adjustable tables can be furnished. The T-slots of the table are milled from the solid.

At the plant of the Scully Steel & Iron Co., Chicago, the Chicago Belting Co., of that city, more than nine months ago, installed a 22-inch leather belt for driving a cold saw. The service is particularly severe, as the belt speed is 6,000 feet per minute and the belt develops over 200 horsepower. Although operating for a period of more than nine months, the belt was not shortened and has not stretched during that period. The belt is of the white-strip type and this principle is being applied by the Chicago Belting Co. in the manufacture of canvas belting for power transmission.

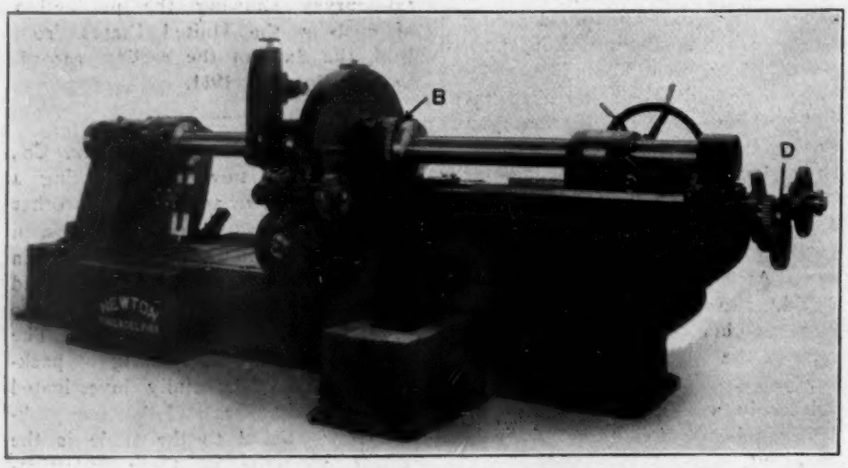
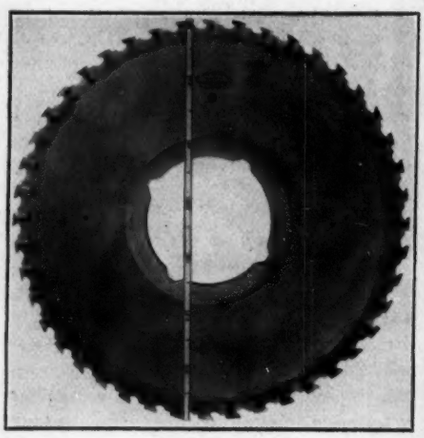


FIG. 2—DRIVING SIDE OF CYLINDER BORING MACHINE

Large Inserted-Tooth Saw Blade

The accompanying illustration shows one of two large inserted-tooth, metal-cutting saw blades, recently manufactured by the Hunter Saw & Machine Co., Pittsburgh. The blade is 84 inches in diameter, is made from 1-inch plate of special analysis, and is treated to withstand great strain. Two collars, one on each side and each 26 inches diameter, are riveted to the body of the saw, and are milled with four equally-spaced keyways, by which the blades are driven.

The blades are milled with 44 pockets, into which are inserted alternately, roughing and finishing teeth, weighing 1¾ pounds each and made of high speed steel. Each tooth is reinforced and held rigidly by a tool steel wedge weighing ¾ pound, inserted at the back of the tooth. The plate is drilled and tapped at the bottom of the pockets, to admit a hexagon head brass screw which is used in setting the teeth to the proper height. The



SAW BLADE FOR CUTTING 40-INCH INGOTS

blades weigh 1,200 pounds each, are driven by 75-horsepower motors, and were designed for cutting 40-inch ingots. It is claimed that they are capable of cutting 24-inch ingots in 10 minutes.

According to the *Daily Consular and Trade Reports*, an endurance race was held recently, arranged by the Odessa Auto club, in Odessa, Russia. The route was from Odessa to Sebastopol and return, a distance of about 795 miles, and there were 16 entries, including German, French, English and American cars. At each stop the condition of the cars was noted carefully by a committee. Of the 18 cars that arrived at Odessa, only four, the Case, Dixie, Adler and Lorentz-Dietrich, were without marks against them. The cup was finally awarded to the American Case car.

Jar-Ramming and Turn-Over Draw Molding Machine

A combination jar-ramming and turn-over draw molding machine has been designed by the International Molding Machine Co., Chicago, to meet the requirements of the foundry trade for a labor-saving molding device to handle the class of work to which the jar-ramming, as well as the roll-over principle applies. The machine is particularly adapted for molding such patterns as pistons and piston rings and work of a similar character. As illustrated in Figs. 1 and 2, the machine consists of a main frame or stand, a turn-over frame or pattern carrier and a crank, the function of which is to release the mold from the pattern after it has been rolled over and to support the mold in the proper position for lifting off.

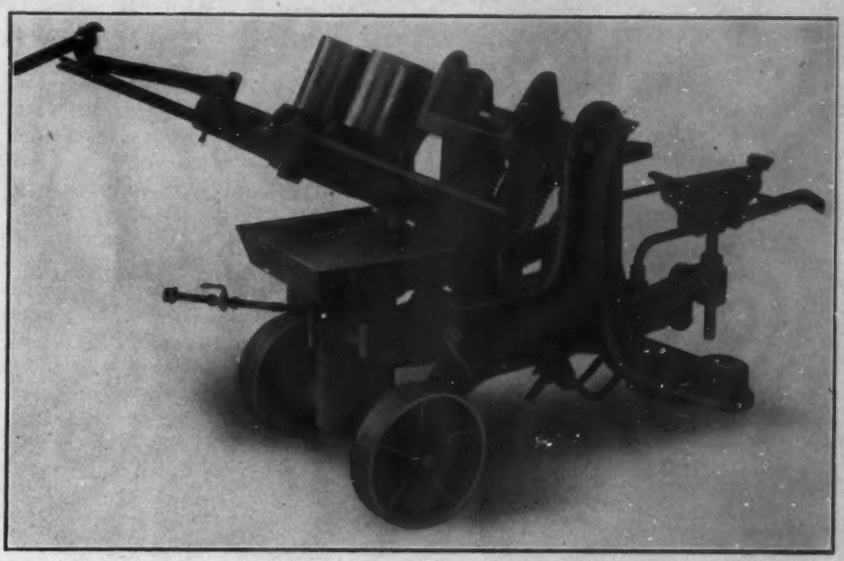


FIG. 2—ANOTHER VIEW OF THE COMBINATION JAR-RAMMING MOLDING MACHINE, SHOWING THE JAR-RAMMING CYLINDER

The jar-ramming section of the machine consists of two heavy castings, including the piston and table, which are cast integral, and the cylinder. The machine is of the valveless type and the operation of the piston is effected by port holes in the cylinder and a groove in the piston. A reservoir is provided for storing the air admitted during the downward stroke of the plunger and this compressed air is utilized to assist in raising the plunger on the succeeding upward stroke, thereby effecting a large reduction in the air consumption. To eliminate the vibration of the entire machine while the mold is being rammed, the pattern plate, which rests on the table of the jar-ramming cylinder, is disconnected from the turn-over frame. This is accomplished by a locking and releasing mechanism which consists of a steel lever with rollers attached to the turn-over frame, a slotted pin which is attached to the jarring plate and an arm so located that when the turn-over frame is being lowered into the position shown in Fig. 1, the roller on the sliding lever is engaged by the arm and drops down into the slot, causing the lever to slide forward and disengages it from the pin which previously held the plate and frame. Stops are provided slightly below the surface of the jar-ramming table for holding the turn-over frame when released from the jarring plate.

The two telescoped columns, in which the parallel steel uprights travel while the foot lever is being lowered for releasing the mold, are provided with brass bushings extending their entire length. This insures a long bearing surface and on the machine illustrated it is 18 inches long. Attached at one end to the turn-over frame and at the opposite end to a stationary steel shaft at the rear of the machine, is a set of extension springs which counterbalance the weight of the mold while it is being turned over. These springs are equipped with eye bolts having right and left hand threads which permit of adjusting the tension in proportion to the weight of the mold. Another set of springs, attached at one end to the crank and at the other end to the cross-rail of the steel frame, is provided to raise the mold automatically to convenient height for the molder when lifting off. These springs also support the weight of the mold when it is lowered onto the receiving table and after it is lowered away from the pattern.

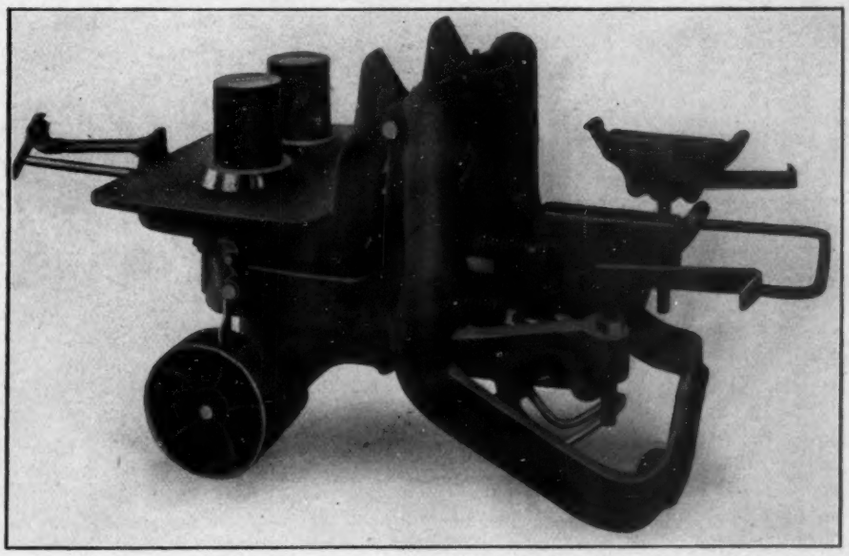


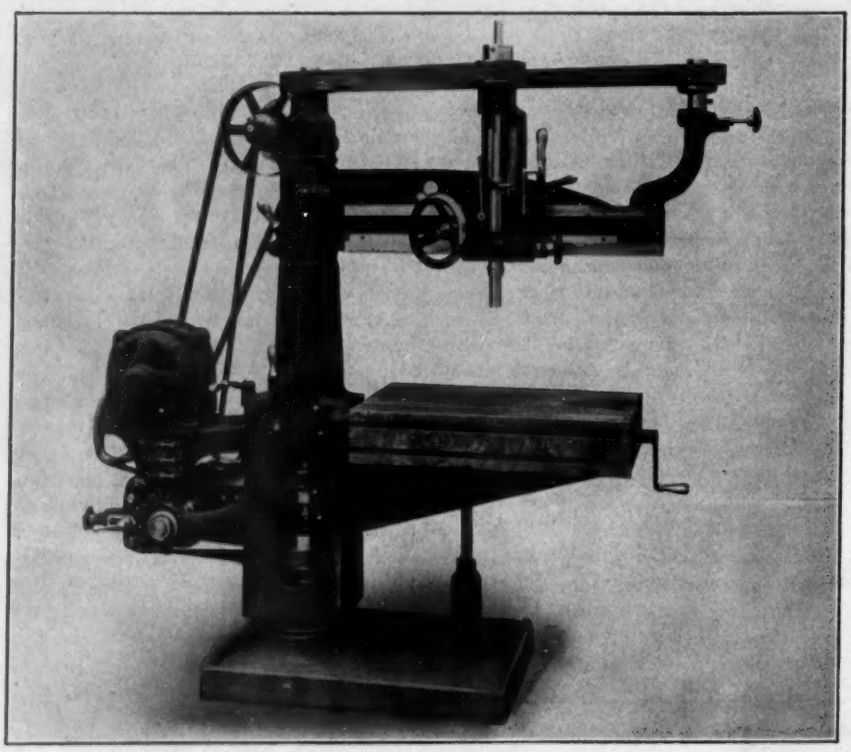
FIG. 1—COMBINATION JAR-RAMMING AND TURN-OVER DRAW MOLDING MACHINE

The two sets of stops which are provided to limit the movement of the pattern frame when it is turned over are machined so as to locate the plane of the pattern at the proper angle to effect a perfect draw. To the steel shaft on which the turn-over frame revolves there is attached an adjustable flask rod for clamping the bottom board and mold to the turn-over frame. The flask receiving devices have points of contact which are depressed to compensate for irregularities in the surfaces of bottom boards and these points of contact are locked by levers when the flask is in position. The height of these receiving devices is adjustable to flasks of different depths. All working parts are well protected from sand and the center columns which engage the steel uprights have

been raised above the floor level. The mold is turned over and the pattern is released by hand. However, when the work to be molded is too large to be handled in this way, this machine is provided with air cylinders, a large one in the center being utilized to turn the mold over, while smaller cylinders are located on either side for drawing the pattern.

Sensitive Radial Drill

A new sensitive radial drill, shown in the accompanying illustration and designed for drilling and tapping small holes at high speed, is being built by the American Tool Works, Cincinnati, and combines the high speed of the plain sensitive drill with the capacity of the radial type. The machine can drill holes up to ¾ inch in diameter, in work such as switchboards, automobile chassis, transmission cases and engine frames.



SENSITIVE RADIAL DRILL BUILT BY THE AMERICAN TOOL WORKS

The feed lever is placed on the head, within easy reach of the operator's right hand, and does not interfere with work set up on the table. Other levers are so located as to aid in the quick and easy manipulation of the machine. When the ratchet lever feed is placed in its vertical position, it is disengaged automatically from the rack pinion shaft, permitting the spindle to be adjusted quickly by a small star knob on the end of the rack pinion shaft. The head can be moved rapidly along the arm by a rack and pinion operated with a hand wheel. The latter is on the operator's left, enabling him to swing the arm with the right hand and to adjust the head with the left hand. The arm binding lever is on the column end of the arm.

The head consists of a main saddle having a bearing on the side and carrying an auxiliary head upon a vertical dovetail. The sliding head can be moved toward or away from the table. The auxiliary head can be clamped at any point along the dovetail, and the head itself can be bound to the arm by a lever. The table is of box construction and is strongly ribbed. The top and front sides are provided with T-slots planed from the solid, and the back end is planed for squaring-up work, etc. An elevating table is used for supporting castings too large for the stationary table. The construction of the arm permits the full capacity of the drill to be used at any point throughout its length. Provision also has been made on the head for variable heights of work. The drill is driven by a 2-inch double-belt.

The driving and idler pulleys are equipped with ball bearings consisting of a double set of hardened and ground ball races and cones, one set at each end of the pulley journals. The spindle is of high carbon, crucible steel, and is provided with a dust-proof, self-lubricating ball-thrust bearing. There are six changes of speed, ranging from 300 to 900 revolutions per minute, and an adjustable stop collar may be used as a depth gage. The column is of tubular section, well-ribbed internally, and extends through the arm into the cap at the top of the drill, being bolted to the top of the table. The countershaft is designed for high-speed work, and furnishes two speeds. The boxes in the hangers are of the gravity and wick-oiling type, and are supplied from large reservoirs. The countershaft carries a three-step cone pulley, with a pair of 10-inch friction pulleys, having a 3-inch face, and which run at 310 and 387 revolutions per minute.

Zinc Breaks Record

The production of primary spelter (zinc) from domestic ore in 1911 was 271,621 short tons, valued at $30,964,794, according to a statement issued by the United States geological survey. This is the greatest production in the history of the industry and shows an increase of 19,142 tons over 1910. The imports of spelter, however, reached the lowest figures in recent years, while exports increased about one-half over those of 1910.

The great growth of the zinc industry in the United States is indicated by the following figures:

PRODUCTION OF SPELTER IN THE UNITED STATES FROM DOMESTIC AND FOREIGN ORES, 1880-1911.

	Short tons.
1880	23,239
1890	63,683
1900	123,886
1905	203,849
1910	269,184
1911	286,526

Fire Brick Melting Points

The United States bureau of standards has defined the melting point of firebrick as being the lowest temperature at which a small piece of brick can be seen distinctly to flow. The following melting points of important materials in firebrick were determined: Kaolin, 1,740 degrees Cent.; pure Al_2O_3, 2,010 degrees; pure SiO_2, 1,750 degrees; bauxite, 1,820 degrees; bauxite clay, 1,795 degrees; chromite, 2,180 degrees. Silicon carbide begins to decompose at 2,220 degrees after prolonged heating, but does not melt at much higher temperatures with short heating. Forty-one samples of fireclay brick were tested, the melting points of which were from 1,555 degrees to 1,725 degrees Cent.; eight samples of bauxite brick had melting points from 1,565 degrees to 1,785 degrees; three of silica brick from 1,700 to 1,705 degrees; one chrome brick gave 2,050 degrees and one magnesia brick gave 2,165 degrees Cent.

Electric Furnace Methods of Steel Production--IV

Induction Furnaces of the Kjellin and Rochling-Rodenhauser Types—A Discussion of Their Advantages and Disadvantages

By John B C Kershaw

The Kjellin and Rochling - Rodenhauser electric furnaces are the most important forms of the induction types and the latest data, recently available, show a total of 10 of the former and 17 of the latter in operation or under construction in Europe and America. The largest of these furnaces, which is of the modified Kjellin type, with a capacity of 12,000 kilograms, has been installed at the Rochling Iron & Steel Works, Volklingen, Germany. Other large installations in Germany of this type have been made at the works of the Bergische Stahlindustrie, at Remscheid, and in the plant of Eicher Huttenverein-Le Gallais, Metz & Co., Dommeldingen.

First Kjellin Furnace

In an electric refining medium of the induction type, the metal is the secondary circuit, while the furnace serves practically as a transformer. The Kjellin furnace as originally patented in 1900, is shown in section and plan elevation in Figs. 7 and 8, respectively. The primary coil is illustrated at *C* and the bath of molten metal in the form of a ring, which is the secondary circuit, is shown at *B*. The primary coil is supplied with alternating current and the intensity of the induced current in the secondary circuit of molten metal can be calculated roughly by multiplying the amperes of the primary current by the number of turns contained in the coil. Approximately 1,000 kilograms of molten pig iron or scrap steel are poured into the annular ring, *B*, and the current then is switched into the primary coil. A current of 90 amperes at 3,000 volts is utilized, which is transformed in a secondary coil to a current of 30,000 amperes at 7 volts. To the charge of molten metal, 800 kilograms of cold pig iron or scrap steel are added, in equal proportions, to the bath. Covers are provided to permit of the uniform distribution of these additions and the metal is heated for periods varying from 4 to 6 hours until it has obtained the degree of purity desired. Of the metal charged, approximately 1,000 kilograms are tapped out of the furnace and the remaining 800 kilograms are left in the furnace to carry the current until other raw materials are added. By this process, the carbon is reduced while the silicon is increased.

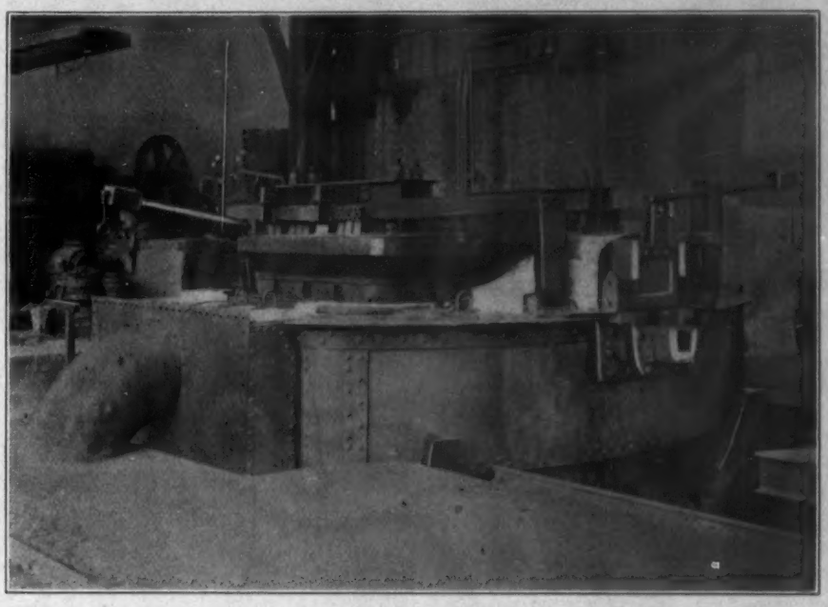


FIG. 2—TAPPING SIDE OF ROCHLING-RODENHAUSER ELECTRIC FURNACE

FIG. 1—ROCHLING-RODENHAUSER INDUCTION FURNACE, 8 TO 12 TONS CAPACITY. THIS IS A VIEW OF THE CHARGING END

Power Consumption

The average power consumption of a furnace of this type is 936 kilowatt-hours per gross ton. The raw material used in the test, upon which this result is based, was Swedish pig iron, bar iron and steel scrap from the previous charges. The steel produced contained only 0.008 per cent sulphur and 0.01 per cent phosphorus. One heat showed a carbon content of 0.417 per cent and

FIG. 3—CHARGING A ROCHLING-RODENHAUSER FURNACE WITH MOLTEN METAL

the steel from another heat contained 1.082 per cent carbon. The temperature of the steel when tapped is approximately 1,700 degrees Cent., and the cost of producing steel in the Kjellin furnace is estimated at approximately $35 per ton of 2,000 pounds. A 1,500-kilogram furnace installed at Gysinge, Sweden, is illustrated in Fig. 6, which clearly shows the covers over the metal bath through which the additions are made.

Lining the Annular Ring

Crushed magnesite or dolomite is used for lining the annular ring which serves as the crucible, and a small amount of lime also is employed as a protecting slag. Great care must be exercised when drying the lining before the furnace is placed in operation and the drying-out process usually continues for periods varying from 60 to 70 hours. The lining will continue intact from 4 to 8 weeks, according to the tonnage refined and the temperature of the metal. The cost of the lining is estimated at $1 per ton of finished steel. Tests with a 125-kilowatt furnace of the original Kjellin type indicate that 650 kilowatt-hours are required in the production of one metric ton of steel and 750 to 800 kilowatt-hours are required for high grade steel. The furnace efficiency is estimated at 70 to 75 per cent. It has not been found practicable to make more than six heats in 24 hours when operating on high grade tool steel, for the reason that the steel must be left quiescent in the furnace at a high temperature for a considerable period to permit the occluded gases to escape. The killing period adds from 60 to 200 kilowatt-hours per ton of steel melted.

Among the disadvantages of the Kjellin type of refining furnace are the following: Only small quantities of metal can be refined during each heat, and if the section of the bath is increased in width, the resistance is lowered and the power factor is diminished. On the other hand, if the ring of molten metal is increased in diameter, but is reduced in section, the distance from the primary coil will be increased and the power-factor again will be diminished. The comparatively low temperature makes it impossible to keep the slag sufficiently fluid to obtain the rapid removal of the sulphur and phosphorus. For these reasons the original Kjellin type of induction furnace was confined to the melting of scrap and steel not requiring purification.

Combined Furnace

The Kjellin furnace was greatly modified by Rodenhauser and Schonawa and what is generally known as the Rochling-Rodenhauser combined resistance and induction furnace has been evolved. The first furnace of this type was placed in operation at the Rochling Iron & Steel Works, at Volklingen, Germany, in 1907. The combination furnace consists of a transformer with two or three ring-shaped baths adjacent to and communicating with each other and in the center between these rings there is a square or rectangular hearth. The material is charged into the furnace through doors at the front and rear. A feature of this furnace is a heavy secondary winding of copper cables placed around and co-axial with the primary, one on each leg of the core, and surrounded by the rings forming the charge. These copper secondaries, consisting of a few turns only, are connected to plates built into the furnace wall and for a single-phase furnace there are two in front and two at the back. These plates consist of corrugated cast steel sections with a compound of magnesite, dolomite and tar, applied over the corrugations. The plates, when cold, are poor conductors, but as soon as the furnace is charged with molten metal, they become good conductors of electric current. Therefore, about one-half of the power is transmitted to the charge by induction in the rings and the other half is transmitted through the side plates.

For carrying out any steel refining

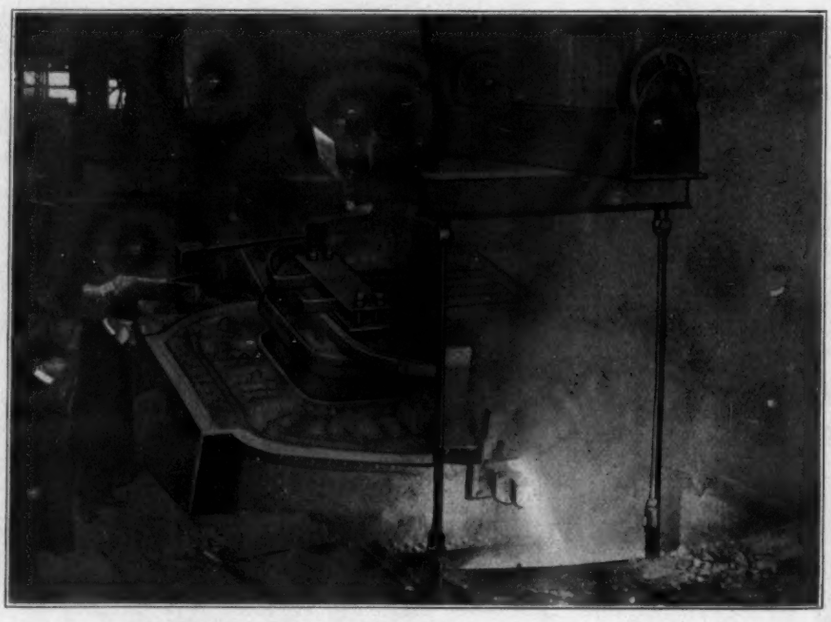


FIG. 4—INDUCTION FURNACE TILTED WHILE TAPPING THE METAL

process, a liquid slag, with means for manipulating it, is required. In the arc type of electric steel refining furnace, this is effected by the arc between the carbon electrodes and the slag blanket. In the Rochling-Rodenhauser furnace, this liquid slag is raised to and maintained at the required temperature in the resistance portion of the furnace. Part of the power is induced in the rings, thereby heating the charge, and the remainder passes through the side plates to obtain a sufficiently liquid slag. The ring-shaped section of the furnace, containing the metal bath, is covered with bricks to a height below the level of the charge in the center bath. Therefore, slag cannot enter the rings and as the slag is injurious to the lining, the rings require practically no repair during a long run. On the other hand, the rectangular hearth in the center is easily accessible for repairs to the linings. It has been claimed that the use of these plates would be equivalent to the use of carbon electrodes with all their disadvantages, but practice indicates that this is not the case. The plates show little wear and hardly can be termed electrodes.

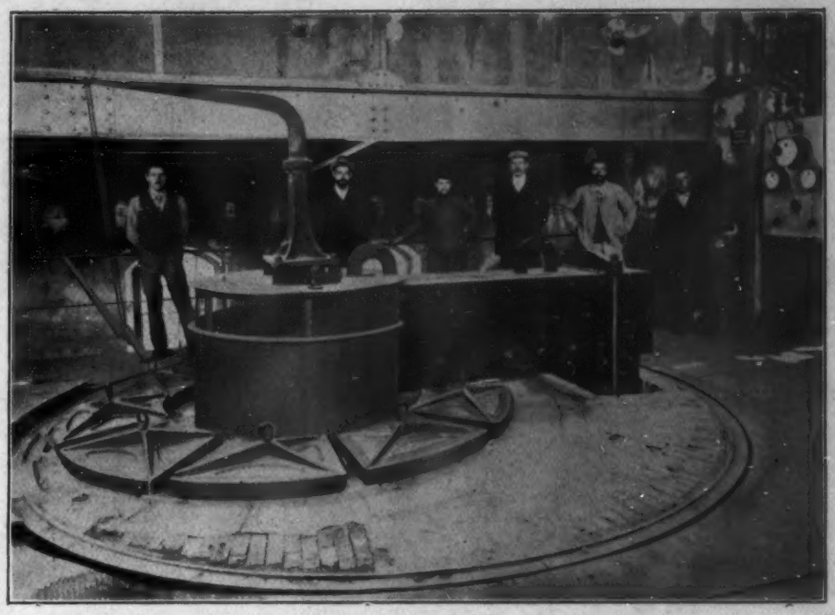


FIG. 6—THE KJELLIN FURNACE AT GYSINGE, SWEDEN

Furnace Reactions

After the lining is in position, the tar is burnt out, either by heating the cast steel ring or by pouring a small quantity of molten pig iron into the hearth. The pig iron used for this preliminary heating is tapped out of the furnace and is employed in the Bessemer converter. It has been found more economical to burn out the carbon and silicon in the converter than in the electric furnace. The large furnace at Volklingen has a capacity of four tons and calcined lime is added to form a suitable slag, which sometimes contains about 6 per cent of magnesia. If required, a small amount of fluorspar also is added for fluxing purposes. For decarbonizing, rolling mill scale is used. If in a highly fluid condition, the slag will take up phosphorus readily, after which it is made more viscous by an addition of cold lime, and then is drawn off through the slag door by slightly tilting the furnace. To successfully effect dephosphorization, the charge should be in a condition known as hot brittle, that is, it should have an excess of oxygen to prevent the phosphorus from again being absorbed by the molten metal. After removing the slag, ferro-silicon or carbon is added. It has been found that the addition of ferro-silicon will reduce the deoxidation period considerably, and if power is cheap, carbon may be employed. However, if the power cost is high, it is advisable to use ferro-silicon. As soon as the dephosphorization is effected, the first slag is removed and a fresh slag of lime only is formed, which acts as a desulphurizer by the formation of iron sulphide. Deoxidation of a bath is effected partly by the combustion of the ferro-silicon or carbon, thereby increasing the temperature of the bath. Finally, the maximum power is applied to drive out the last trace of oxygen and as soon as the gas bubbles have disappeared, a test piece is cast and forged. If the steel is too soft, carbon additions are made as required. The refining operation can be completed in from 1¼ to 2 hours, but if necessary, the steel can be permitted to remain in the furnace for 10 or more hours without affecting its quality. Therefore, it is possible to refine raw material which contains up to 0.1 per cent phosphorus and sulphur. The resulting product will contain only 0.005 per cent phosphorus, 0.02 per cent sulphur, 0.05 to 0.01 per cent manganese and 0.01 per cent silicon.

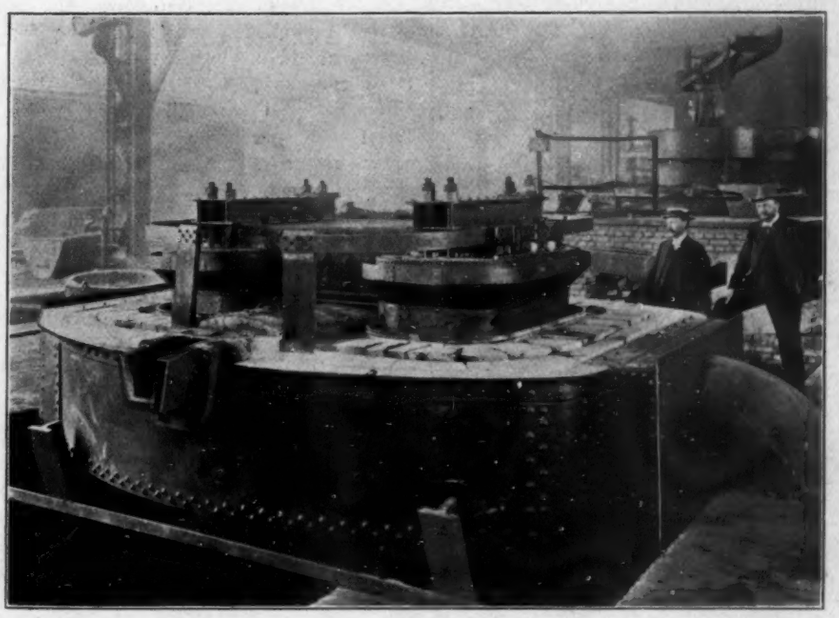


FIG. 5—A 3½-TON ROCHLING-RODENHAUSER FURNACE AT VOLKLINGEN

Furnace Temperatures

No difficulty is experienced in maintaining uniformly the temperature of the metal in different parts of the furnace. Many tests have been made which indicate that the steel throughout the bath is of uniform quality and composition. When molten metal from a Bessemer converter is charged into the furnace, the power consumption will

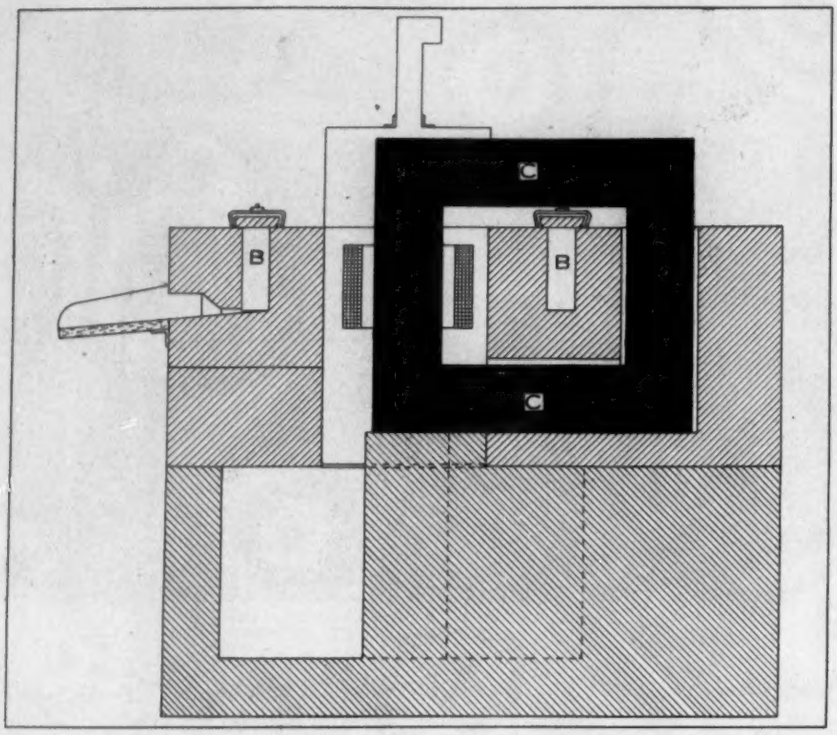


FIG. 7—SECTIONAL ELEVATION OF KJELLIN FURNACE OF THE EARLIER TYPE

average not more than 130 kilowatt-hours. Recently, a 10-ton furnace refining basic Bessemer steel has been operated at a power consumption of 200 to 250 kilowatt-hours per metric ton. The metal charged into the furnace contained phosphorus, 0.08 per cent, and sulphur, 0.09 per cent. After the refining operation, only one-tenth of these impurities remained. The Rochling-Rodenhauser type of induction furnace will melt cold scrap with a power consumption of 580 kilowatt-hours per ton.

The cost of making one metric ton of steel in a two-ton furnace at Volklingen, considering raw material at $12.60 a ton, is $21.75. The conversion cost was estimated at $9.15, electric current cost 0.6 cent per kilowatt-hour and the fluxes and additions consisted of 22 pounds of roll scale, 77 pounds of lime, 11 pounds of fluorspar and 8.8 pounds of ferro-manganese. The time required for making the heats, upon which these estimates were based, averaged from 4 to 4¼ hours. The cost of conversion when hot metal is used is considerably reduced and in one plant was placed at $7.05 per ton. The time required to make the heats when using hot metal also is reduced materially and does not average more than 2½ hours. The estimated cost of refining hot metal melted in a cupola and consisting largely of steel scrap, is $23.02 per ton. In this estimate, the raw material cost $14 and the cost of the preliminary melt in the cupola was $3. The conversion cost was placed at $4.90. The time of one of these heats was 3½ hours.

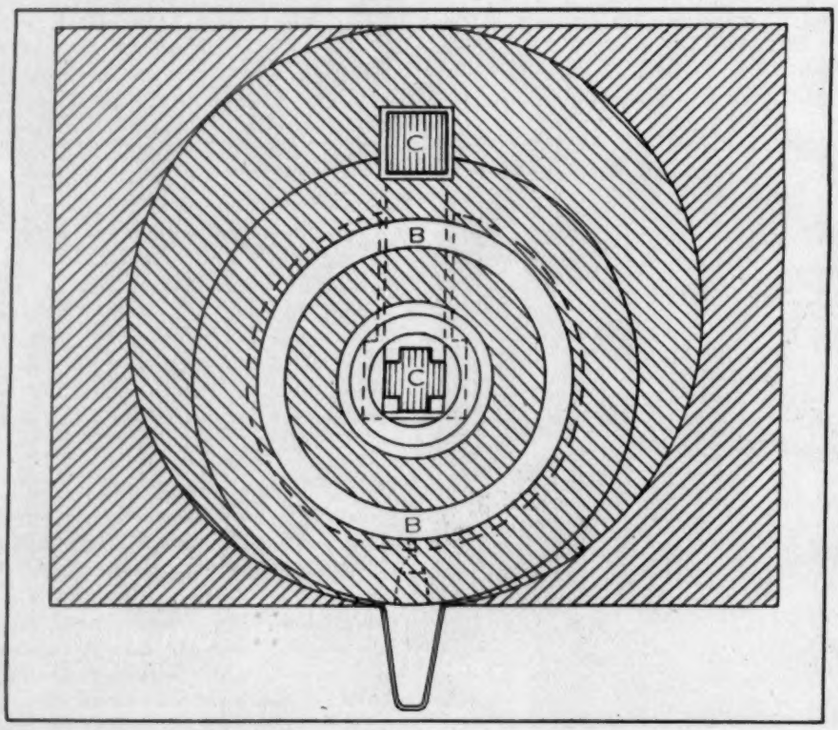


FIG. 8—PLAN OF KJELLIN FURNACE

In a paper presented by Kjellin at a meeting of the American Electro-Chemical Society in 1909, he estimated that the cost of steel for rails refined in a 7-ton, 3-phase Rochling-Rodenhauser furnace was approximately $18 a ton.

Steel refined in the Kjellin and Rochling-Rodenhauser induction furnaces has great strength, tensile tests frequently reaching 110,000 pounds per square inch with an elongation in 8 inches of from 17 to 18½ per cent and contraction varying from 30.8 to 31.4 per cent. The steels which gave these results varied in chemical content as folows: Carbon, 0.50 to 0.55 per cent; manganese, 0.85 to 0.4 per cent; silicon, 0.25 to 0.30 per cent; sulphur, 0.025 to 0.03 per cent, and phosphorus, 0.04 to 0.05 per cent.

Probably the most notable installation of electric induction furnaces of the Kjellin and Rochling-Rodenhauser type is at the plant of Le Gallais, Metz & Co., Dommeldingen, Germany. The refining equipment consists of four furnaces of the following capacities: 12,000 kilograms, 4,000 kilograms, 1,500 kilograms and 1,000 kilograms. Molten steel and cold scrap are employed as raw material. When charged with molten metal, the variation in power consumption is exceedingly slight.

The Stassano Electric Furnace

To the Editor:

While the description of the various types of Stassano furnaces published in THE IRON TRADE REVIEW, Nov. 21, is very complete and up-to-date, the data concerning costs of operation, as Mr. Kershaw himself states, were gleaned from the earlier types, the figures referring to operations in September, 1909. The Austrian furnace referred to was built and placed in operation by the writer at

St. Polten, Austria, at that time. The electric current consumption of 1,010 kilowatt-hours per metric ton refers to the first heat made in the furnace, but during the second week of operation, I succeeded in reducing this materially so that two consecutive cold charges showed current consumption of 787 and 810 kilowatt-hours, respectively, per metric ton. Every precaution was taken to insure accurate measurements. The average consumption of current, covering several months' operation of the same furnace, including the current used for heating the new linings, maintaining the requisite temperature between charges and on Sundays when no melting was done, was 900 kilowatt-hours per metric ton of 2,205 pounds. This average, which is lower than shown in other electric furnace practice in one-ton units, no doubt is due to the design of the melting chamber of the Stassano furnace, which is entirely enclosed, thereby reducing heat losses to the minimum. To the list of late Stassano installations may be added another furnace of the tilting type erected at St. Polten, Austria, one furnace installed by Armstrong & Co., Ltd., at Newcastle-on-Tyne, Eng., and two furnaces at Buchanan, Mich., the latter being the first Stassano electric melting medium installed in the United States.

E. M. SCHMELZ, Detroit.

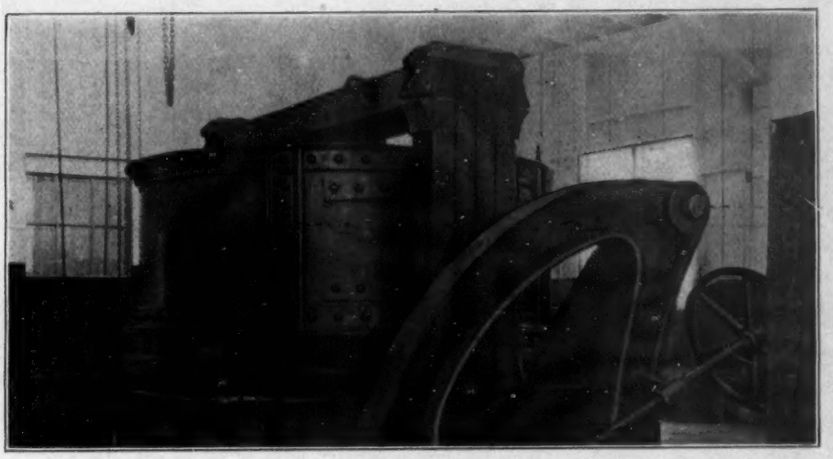


FIG. 9—KJELLIN FURNACE, 1,600 TO 1,800 POUNDS CAPACITY, INSTALLED IN THE PLANT OF DEERE & CO., MOLINE, ILL.

A carload of foundry equipment recently was shipped by the Osborn Mfg. Co., Cleveland, to the Compania Nacional Esmaltadora, City of Mexico. The shipment consisted of two jolt-ramming molding machines, one sand mixer, two geared crane ladles, two portable core ovens, swinging grinders, two fuel-oil burners for drying molds and lighting cupolas, six steel wheelbarrows, etc.

Concrete Bridges Replace Wooden Type

The Northern Pacific railroad is replacing wooden trestles and small iron bridges, along its line between the great lakes and Seattle, by bridges made of ferro-concrete slate. The side and bottom pieces and the piers of the bridges consist of skeletons of steel work surrounded by concrete, and are cast in molds in certain standard sizes at a central plant, situated in Montana. The slabs and piers rest upon concrete piles, with caps of steel. The piles are driven into the ground by a specially designed pile-driver, and the piles are said to withstand blows that would shatter the ordinary wooden pile. The new bridges are reported to be superior in every way to the old ones, especially as regards strength, permanence and proof against fire. In addition, they require no cleaning, painting or other treatment.

Electric Resistivity of Special Steels

The results of an investigation of steels containing nickel, manganese, chromium and tungsten to ascertain their relative electric resistivity, conducted by O. Boudouard, of Paris, were reported at the sixth congress of the International Association for Testing Materials

His conclusions are as follows:

1.—In carbon steels the electric resistivity increases with the carbon contents.

2.—In nickel steels the resistivity is considerably augmented by an increase in the carbon percentage, the nickel percentage remaining the same.

3.—In manganese steels the carbon contents do not seem to intervene.

4.—The chromium steels show important irregularities, both for low and for higher carbon percentages.

5.—In the tungsten steels, the state of the metal does not sensibly affect the resistivity.

Natural Gas Production

Seventy-four million dollars was the value of the natural gas produced in this country for 1911. While there was a decrease in quantity from the output of 1910, the figures for the two years being 509,155,309,000 and

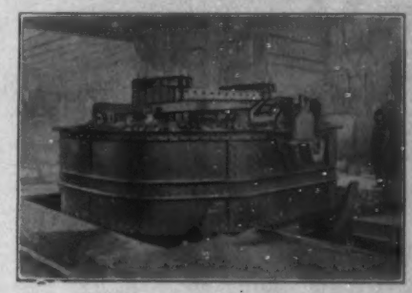


FIG. 10 — SINGLE-PHASE ROCHLING-RODENHAUSER FURNACE, SIMILAR TO THE ONE INSTALLED BY THE CRUCIBLE STEEL CASTING CO., LANSDOWNE, PA.

508,353,241,000 cubic feet, the value of the production in 1911 was nearly four million dollars greater than that of 1910, a gain of 4.76 per cent. The increase in demand for natural gas from consumers of all kinds, according to David T. Day, of the United States geological survey, makes the supply of gas a matter of growing seriousness. In Ohio and Indiana the yield has diminished so rapidly as to stop the investment of the further capital necessary to increase production. Pennsylvania was the greatest consumer of natural gas in 1911, with an output of 154,475,376,000

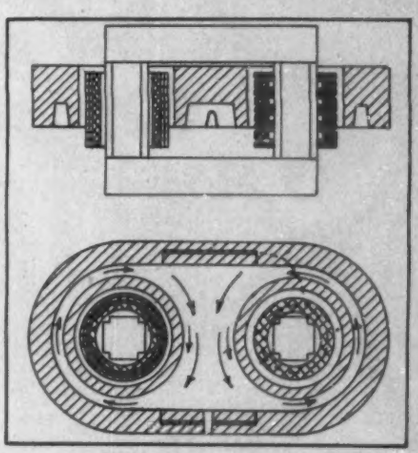


FIG. 11—PLAN AND ELEVATION OF A SINGLE-PHASE ROCHLING-RODENHAUSER FURNACE

cubic feet; Ohio was second, with 112,123,029,000 cubic feet, and West Virginia was third, with 80,868,645,000 cubic feet.

Welding and Cutting With Oxy-Acetylene Gas[1]

The Wide Application of the Process, With Some Comparative Costs—Used Successfully With Many Metals

By M S Plumley

The nature and history of the oxy-acetylene process, together with economical and efficient apparatus for its operation, have been the subjects of exhaustive discussions from time to time. Two systems of generating the acetylene are used, high and low pressure. The low pressure system delivers acetylene directly from the generator to the blowpipe under a pressure of a few ounces only, and a uniform pressure, which is an essential requirement, is maintained at all times. The high pressure system delivers acetylene to the blowpipe under a pressure of more than 1 pound per square inch. The acetylene is supplied by a generator operating under 15 pounds or by compressed or dissolved acetylene contained in steel tanks, and a diaphragm reducer is used. This system gives excellent results, especially for emergency work where portability is an essential feature. Both systems have their advantages under certain conditions. The low pressure system gives excellent results in the foundry, machine shop, boiler shop, forge shop, steel mill, structural shop, and for cutting steel, etc.

Metals May be Cut and Welded

With the oxy-acetylene process may be welded two parts of iron, steel, brass, copper, bronze, aluminum, platinum, and other metals, by fusion without subsequent compression. It is the most economical method known for cutting iron and steel, and for light or heavy repair work and special jobs it has a distinct use. Temperatures ranging from 6,000 to 6,500 degrees Fahr., above the melting point of platinum, are made in small spaces.

The practicability of the oxy-acetylene welding and cutting process has been established by successful use under ordinary working conditions in many plants and the commercial possibilities of the process are being rapidly extended, since many of the largest engineering concerns throughout the world have adopted it. New applications are being discovered daily. Many operations which were considered impossible or difficult of accomplishment a few years ago are being carried on today as a matter of ordinary shop practice. In considering either the theoretical or practicable applications of the process, the inherent characteristics of the metals being worked upon should be remembered. For instance, every foundryman knows that allowance must be made for expansion and contraction in every stage of the manufacture of iron and steel. Again, some metals, such as aluminum, brass, copper, etc., oxidize rapidly under certain temperature conditions. Many failures which have been attributed to the oxy-acetylene process are traceable to two causes, first, poor equipment, including generators, torches and other accessories, and second, lack of intelligent handling on the part of the operator.

Operation Not Difficult

It must not be inferred from this that the process is either extremely difficult or that it requires more than an ordinarily intelligent operator to secure successful results. However, it is a fact that in the majority of cases where an oxy-acetylene plant is installed the operator forgets that metals expand and contract, and in some instances oxidize readily. It is usually necessary to remind him of these properties of metals and most of the other facts about the nature of metals with which he is thoroughly familiar and which he applies every day in his regular work. While remarkable results, with great savings of money, time and material are being effected daily through the use of the process, it should always be borne in mind that metals will act no differently under the oxy-acetylene flame than they do in the cupola, casting mold or forge. There are two methods of making autogenous welds. The first, suitable for thin plates, requires that the edges be brought into perfect contact, after which they are fused without the use of additional material. The second, used for thick plates, consists of fusing into a groove formed by the beveled plate edges, material similar to that in the plate. The thickness generally given as a dividing line between the two methods is ¼ inch.

The claim of 100 per cent efficiency is not made, 95 per cent being about as high as may be obtained, provided the weld to be tested is the same thickness as the original plate. In many cases the tensile strength and efficiency of the weld are increased by hammering lightly while at the proper temperature and subsequently annealing the piece. The blowpipe operator may build up his weld at will by means of a piece of steel or iron wire which is fused into the flame so that the section at the weld is greater than elsewhere, in this way gaining greater efficiency. Such a weld gives from 10 to 15 per cent higher tensile strength than a riveted joint. Not long ago an operator tried to weld a new half side-sheet in a locomotive fire box by putting the sheet in its correct position, fastening it securely with bolts, then applying the blowpipe to the longitudinal seam to be welded. The result was that upon applying the heat to the rigid plates, expansion set in and as the plates were not free to move, an upsetting of the molecules in the metals took place, which always tends to weaken. Upon subsequent cooling and contraction the plates were left under a strain. That operator did not apply what he already knew about the action of metals when subjected to high temperatures.

Correct Welding Method

The weld then was made by the following method: The edges to be welded were separated. Under the effect of the heat they gradually drew together as the weld progressed along the longitudinal seam. Being free to expand and contract no strains were left in the finished work. It is interesting to note in this connection that a ½-inch plate will draw together at the rate of ⅜ inch per foot. A simple and efficient method of expansion and contraction, in cases where plates are not movable, is to apply heat in the vicinity of the weld or to provide corrugations or boxed places in the plates, these tending to bend or pull

[1]From a paper read at the annual convention of Iron and Steel Electrical Engineers, at Milwaukee, 1912.

straight under the action of these forces.

The welding and cutting of steel plate can be accomplished with great economy. While it is true that upon the introduction of the process many operations could not be economically carried out because of the high cost of oxygen, it is possible now to obtain oxygen throughout the entire country at such a greatly reduced cost that a welded joint may be made in steel plate at a lower cost than a riveted joint, provided both are to be absolutely tight. Where cutting must be done quickly, many instances are on record of large amounts being saved by having ready access to the process. A 1-inch steel plate can be cut at the rate of one lineal foot per minute at a cost not exceeding 10 cents per foot. A clean, narrow slot can be cut through plates over 12 inches thick. In fact, this is about the only possible way of working on special steel plates of this size. This work can be done at high speed, varying from 65 feet per hour for metal ¼ inch thick to five feet per hour for metal 12 inches thick. The cost varies from two cents per foot in ¼-inch plates to $3.50 per foot in 12-inch plates.

Use in Steel Foundries

In the steel foundry the process both for welding and cutting has been satisfactory. Great savings are possible in reclaiming defective castings, which in many cases may have slight blow-holes or cold shuts, affecting only their appearance, or they may even be defective in such places as to render them entirely unserviceable. In either case the welding blowpipe often makes the defective casting perfect. As an instance, blow-holes in steel car couplers can be filled with new metal. In one of the large foundries recently, a cast steel pinion weighing 4,100 pounds was defective when shaken out of the mold. New teeth were built on and after the casting was machined, no trace of the weld could be discovered. It is sometimes well to preheat steel castings in the vicinity of the weld, thereby reducing the cost of that particular operation. The cutting blowpipe is a valuable instrument in the steel foundry for removing sprues, risers and gates from steel castings. This work can be performed at one-half the cost of sawing. This statement takes into consideration the fact that it is not necessary to set large, heavy castings at the saw and change their position for each separate riser. Much time is saved by being able to bring to these heavy castings suitable equipment which can be operated to cut from any position. In one case 4 x 8-inch risers were cut from a cast steel gear at the rate of 1½ minutes each. One large manufacturer claims that the cutting blowpipe saves him 12 cents a ton for his total output. Manganese steel castings when containing from 6 to 18 per cent manganese are so hard that it is impossible to cut them with steel tools. For such work the oxy-acetylene blowpipe is the only method available.

Used in Making Pressed Steel Products

In the manufacture of metallic furniture, joints can be made which are impossible to detect after the work is finished. In the manufacture of pressed steel products the natural tendency of the metal to expand and contract has been readily taken care of. Jigs are used to hold the light sheet metal in a rigid position so that when the weld is finished there is no evidence of buckling or warping. The possibilities of the process in this work have been largely extended by the introduction of automatic welding machines. With such a machine it is possible to weld sheet metal varying from No. 26 gage to ¼ inch thick. This is done in most instances without the addition of filling material such as is used on heavy metal. Such welding can be done either by feeding the blowpipe to the work or feeding the work to the blowpipe, choice of the method depending upon the work. The automatic welding machine eliminates manual labor almost completely and a large amount of steel tubing is being produced abroad by this process.

In the forge shop the possibilities of the oxy-acetylene process are practically unlimited. Forgings frequently develop serious defects known as cold shuts. Before the introduction of this method these defective forgings were only of scrap value as there was no suitable means to reclaim them. Now, however, they can be welded readily at a cost generally not exceeding 50 cents to $1, while the value of the forging on which the work is done may vary from $5 to $150. As an example, a large manufacturer in filling a contract recently, made about 1,000 drop forgings, after which the design of the forging was altered. This change necessitated the addition of about ¾ of a pound of metal to each forging. Under ordinary conditions this would have meant a heavy loss, but with the welding plowpipe new metal was built onto the forging at a cost including labor, gas and material, of $1.67 per forging. In this class of welding, the most satisfactory results are obtained when a soft Norway iron is fused into the defect as a filling material.

The cutting blowpipe has been found of great value in the forge shop for slotting forged engine connecting rods, crank shafts, side rods, etc. In a connecting rod 6 feet, 4 inches long, 13-inch face and 6 inches thick, a slot has been cut 7 inches wide by 9½ inches long in 15 minutes, at a cost slightly under $3. Eight hours' time would have been required for the old method of drilling and chipping out the same slot. When the oxy-acetylene process is mentioned in connection with structural steel work, it is usually considered from the standpoint of cutting. However, the welding blowpipe is useful for filling up misdrilled bolt holes, bringing more strength to the structural part than if the holes were allowed to remain.

Cutting Structural Material

A building contractor often finds among his structural materials parts which are either too long or too short, and these difficulties are being overcome by the cutting and welding blowpipe. The cutting blowpipe, which since its use in removing the wreck of the Quebec bridge, has superseded all other methods for such work, was employed extensively on the battleship *Maine*. The conditions met in this work were more difficult than would be encountered in most other cases. The wreck had been in the water for about 13 years, during which time the galvanic action of the sea had affected the iron so that it had lost most of its original characteristics.

The conning tower tube consisted of a cast nickel steel cylinder, 2 feet outside diameter, with a uniform thickness of 5 inches, making approximately six lineal feet of cut, through 5-inch metal. The tube had been so twisted by the explosion that it was impossible for the operator to do the most efficient work, as he was unable to see through the cut at any time. It was necessary to work slowly in order to be sure that the oxygen jet was blowing clear through the metal. Before the job was undertaken, the navy engineers stated that they would be entirely satisfied if the tube was removed within three hours' time. There was no hole from which the cut could be started and it was necessary to pierce one with the plowpipe. This first hole was made in 2½ minutes and the entire tube dropped overboard within 54 minutes of the time when the blowpipe was first lighted. An air chisel was run for a few days in competition with the blowpipe. Although this was done under conditions

much more favorable to the former, it was found that the work with the air tool progressed far too slowly and it was finally abandoned. The possibilities of the process in this class of work have only begun to be realized.

In machine shops, workmen continually make mistakes such as cutting away too much metal, drilling holes in wrong places, etc. Such errors generally mean throwing away the piece, although in some cases there are methods of making repairs. The oxy-acetylene process has been found most satisfactory in reclaiming such parts, especially since neither the original mistake nor the weld itself can be detected after the surface has been machined or ground. The blowpipe can also be applied successfully to the repair of broken machine parts. Even large engine bed plates, punch press frames, lathe frames, planer frames, etc., are being successfully repaired in this way.

The repairs made to the stern post of the steamer *Martin Mullen* illustrate well the saving of money, material and time which may be effected. This steamer was driven ashore, in a severe storm on the Great Lakes, and the stern post was broken. The owners faced the serious problem of replacing the 9,000-pound stern post, or of finding some efficient method of repairing it economically. Under ordinary conditions it would have been cut off between the boss and shoe. The shoe would have been saved, but the balance of the post would have been renewed by forge-welding a new piece in place. This would have involved an expense of about $1,500 and probably several weeks' delay. It was decided to weld the break by the oxy-acetylene process. A special preheating furnace was erected and new metal was welded in. The total cost of the weld including fuel, labor, material, and the erection of a special furnace, was only $32, and the stern post was as serviceable as before it was broken. The entire time consumed for the welding operation was about five hours.

Welding Cast Iron

As it is impossible to cut cast iron with the blowpipe, because of the high percentage of uncombined carbon and silicon, which will not oxidize even under the highest temperature, the oxy-acetylene process as applied to this work, is restricted to welding. The cutting process is entirely a chemical action, which will not be successful on any metal that does not readily oxidize after it reaches a temperature of from 1,500 to 2,000 degrees Fahr. The flame of the welding blowpipe has no tendency to change appreciably the chemical contents of gray iron. However, difficulty at one time was met in welding this metal on account of the weld tending to be porous after it was finished. This has been overcome successfully by adding a suitable flux containing principally borax, which reduces the fusion temperature of the iron slightly and gives a more homogeneous weld of the proper texture.

Used to Weld Cast Iron

In welding cast iron it has been found good practice to use a filling-in rod, which is fused by the flame to the material being welded. It has been demonstrated by experiment that a cast iron rod containing about 3 per cent silicon, gives the most satisfactory results. This high percentage of silicon, through its influence on the carbon of the iron, reduces the hardness of the weld considerably, so that it may be easily machined. The contraction and expansion of gray iron is taken care of by preheating and annealing, the value of which cannot be too strongly emphasized. Preheating the whole part to be welded to a temperature of about 1,000 to 1,500 degrees Fahr. distributes the expansion throughout the entire casting more uniformly, preventing an unequal strain in any part. This same principle applies after the weld has been finished, annealing quickly bringing the casting up to an even temperature, so that when it cools, the contraction takes place uniformly throughout the whole structure. Care must be taken, of course, while preheating and annealing, to avoid warping the casting. The most satisfactory and economical method of preheating and annealing large iron castings, is with charcoal and compressed air, principally because the casting can be left on the fire while the welding is being done. For small castings, probably the most satisfactory method is with a burner, using oil and compressed air.

A large blowhole in a small cast iron, gas-engine bed plate was recently welded at a cost, including preheating, labor, gas, fuel and oil, of 40 cents, the weight of the casting being 285 pounds. Broken flanges on cast iron air brake cylinders were built-up and welded in 1¼ hours at a cost of $3.37. A cracked automobile cylinder casting was welded at a cost of 30 cents, including preheating, labor and gas. In cases of defective iron castings, welding is the most economical way of handling, provided a blowhole, crack or other defect can be repaired in 15 minutes, and provided the casting weighs more than 50 pounds. This is a fair working formula.

With all metals which tend to oxidize readily at high temperatures, a flame should be used having a slight excess of acetylene, and using a smaller amount of oxygen than is required for doing the same thickness of work in steel. This action reduces the flame temperature and gives the operator better control of the molten metal. The amount of either acetylene or oxygen used in the blowpipe, may be regulated instantly, so that any desired quality of flame may be produced, either reducing, neutral or oxidizing in character, depending upon the work to be done.

In welding aluminum, it is customary to counteract its natural tendency to oxidize, by using a flux which breaks down the oxide, and prevents the oxidation of the metal when fusing. A compound of lithium, potassium and sodium chlorides performs this function with entire success, and is now used in all cases where aluminum is to be welded. As with cast iron, the preheating and annealing process already described effectively prevents undue expansion and contraction. In some cases, heavy pieces of metal placed around the part to be welded, produce the same results, by preventing expansion from extending any distance through the structure. Aluminum being more ductile than cast iron, only a slight strain will be left near the weld, even if not subsequently annealed. Defective aluminum castings of all kinds can be successfully repaired by the process. A badly cracked aluminum transmission case was welded in 30 minutes, at a cost of approximately 52 cents. Another casting which required a patch and the building-on of a broken corner, was repaired at a total cost of $1.50, including all material, gas and labor.

Welding Aluminum

The welding of sheet aluminum is being done extensively in the manufacture of kitchen utensils. The United States army has just commenced to use the welded aluminum canteen. The welding of aluminum is now an important branch of the industry abroad, especially in the brewing industries, where aluminum is largely supplanting enameled ware. In welding sheet aluminum, as with castings, the fluxes and reducing flame overcome the tendency of the metal to oxidize.

Results from welding rolled brass sheets have so far been satisfactory, even in view of their high zinc content, which oxidizes at a low tem-

perature. Fluxes consisting principally of borax, and the reducing flame described, are employed principally in the work. When the zinc forms an oxide, it comes out of the alloy in the form of a white cloud. In welding brass castings, a manganese bronze alloy rod is used generally for a filling substance and makes a good, strong, homogeneous weld.

In the welding of copper, the tendency to oxidize is taken care of, in addition to using the reducing flame, by covering the surface of the plate with a mixture of potassium phosphate and potassium carbonate to a depth of about ⅛ inch, and 2 inches wide on each side of the seam. Upon the application of the flame, the mixture will melt and form a glaze over the surface of the metal, preventing oxidation and assuring good work. In welding copper plates, it is best to use strips of the original sheets, as a filling material, although the manganese bronze alloy rods used in welding brass also give satisfactory results. An important recent development in this field is the welding of copper bonds to steel rails for electric traction lines. Bonds put on rails by the welding blowpipe give much better electric contact, having only about one-third of the resistance of the older type of riveted bond. The cost is approximately 25 cents each and the expense of welding about 25 cents. The cost of the riveted pin bond is about 80 cents in place; 38 per cent of this cost is, therefore, saved by the use of the welded bond and the efficiency of the joint is increased 200 per cent.

Three Important Factors

The success of the process depends upon three important factors, namely: Oxygen, acetylene and competent operators. When the art was first introduced into this country, no adequate supply of oxygen was available, and as oxygen is a most important element demanded by the process, this was a serious drawback. Oxygen was generated chemically from potassium chlorate at a high cost and with a low percentage of purity. In many cases this not only prohibited the process from the standpoint of economy, but also gave poor results because of the chemical effects of the flame. After the failure of this method came the introduction of the liquid air process for the manufacture of oxygen, which produces gas with a high percentage of purity, and which is sold to the consumer at a low price. It will be readily realized that these two advantages almost completely eliminated the disadvantages existing before their introduction.

There are at present about six large oxygen-producing plants in this country, which number is not sufficient to supply the large demand. However, there are other new plants in process of construction, and before many years have elapsed there will undoubtedly be an oxygen plant in every large city in the country. Acetylene, which possesses the highest calorific value of any gas, can be obtained in convenient form to meet practically every condition demanded by any working problem. It is usually generated in carbide-to-water type generators, where small quantities of calcium carbide are added to large quantities of water, one pound of carbide to one gallon of water insuring cool and safe generation. Generators may be had which in design and construction meet all the requirements of the proper standards of safety set by the insurance interests. Calcium carbide, from which acetylene is generated, may be obtained at exceedingly low prices and the manufacturers have warehouses in most large cities.

Compressed Acetylene

The only condition demanded by the oxy-acetylene process which is not met by stationary acetylene generators is where the object to be handled cannot be brought to the plant, such as wrecking bridges or structural work, and in emergency welding, repair work, etc. In such cases acetylene dissolved and compressed in steel tanks filled with the liquid hydrocarbon, may be substituted. By compressing the gas to about 10 atmospheres, a large volume is obtained in a small space. These tanks are easily portable.

Oxygen and acetylene, therefore, can be obtained under favorable conditions. Labor has had a great deal to do with the accomplishments of the process to date, and will have a most important bearing on its future developments. Intelligent workmen have taken a liking to the work and are much interested in it. Large numbers are daily becoming more and more familiar with the most effective and economical operation of the blowpipe. Steps are being taken to encourage artisans to enter the field and two large schools for the instruction of workmen are being built, one in the east and another in Chicago. In these schools men will be taught to apply the blowpipe economically and effectively to all classes of work.

NEW BLAST FURNACE

Of Oriskany Ore & Iron Corporation Nearing Completion.

Although work on the new blast furnace being erected at North Lynchburg, Va., by the Oriskany Ore & Iron Corporation, is being rushed, the stack will probably not be put in blast before next March. A very open winter, however, which will permit the expediting of the work still unfinished, may result in advancing this date. The furnace, stoves, draft stack, boilers, cast and engine houses are all up. The steel trestles have been built and the bins are now under construction. Two stoves are lined and the work of lining the other two is well under way. The blowing engines are being erected. Work was started this week on putting down permanent tracks.

The contract for the construction was let about 11 months ago. The stack, which will be 80 x 16 feet, equipped with four Hartman hot-blast stoves each 18 x 70 feet, will have an annual capacity of 50,000 tons. The power equipment will comprise one high-pressure and one low-pressure Southwark blowing engine.

Improvements have been made at the mines of the Oriskany company, consisting of a store, 15 houses and three miles of standard gage track.

Tariff Revision Ignored

Toronto, Can., Dec. 3. — Canadian manufacturers are commenting on the failure of the governor-general to discuss tariff legislation in his opening speech to the Canadian parliament. The omission probably indicates that the bill creating the tariff commission, passed by the house of commons, but killed by the senate at the last session, will not be re-introduced this year. Although no comprehensive measure for tariff revision will probably be passed at this session of parliament, it is likely that minor changes may be made, including some additional protection for iron and steel interests.

Heavy Coal Output.—An increase of 421,000 tons is shown in the coal production of the Dominion Coal Co., Glace Bay, C. B., for the first 10 months of this year, compared with the corresponding period of 1911. The figures are 3,743,000 tons, against 3,322,000 tons in 1911. Including the output of the Springfield mines, the production so far this year is approximately 4,100,000 tons.

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Is This a Time for New Construction?

In the councils of producers and consumers of iron and steel there is at this time no question of business discussed so seriously, probably, as the question whether this is a time when capacity should be increased. Upon producers of iron and steel commodities themselves, and upon producers of more finished products made therefrom, there is a pressure for deliveries which is almost unprecedented, which naturally brings up for discussion propositions to increase capacity. Such propositions do not meet with the extremely ready adoption they experienced in 1906, or, to go farther back, in 1902. In those years, there was also heavy pressure for material, though perhaps no heavier than that which is now being felt. There were then fewer clouds upon the horizon. There was little "trust baiting" and there was practically no fear of tariff revision. Labor was in excellent request, but there was no very serious fear that men could not be found, either to engage in new construction work or to man the new facilities when provided.

The question, to build or not to build, at once brings up the question whether the present prices and the present demand are likely to continue. That question in turn immediately brings up another question, whether from the experiences of the past the present demand is large or small, whether or not it is above normal. Now the iron and steel business is really orderly in its irregularities. The saying has come to be accepted rather generally that it is either a prince or a pauper, and there is quite a degree of orderliness in its following that dictum. A fact that is thoroughly established is that demand grows while it sleeps. After every period of depression, demand begins, not where it left off, but at a new and higher rate.

A striking aberration of the trade in recent months has been its failure to realize the simple chronological truth that it is now five years since 1907. Five years is a long time in iron and steel development. A great deal should occur. If demand doubles in 10 years, then in five years it increases 41.6 per cent, for two such successive increases, compounded, make 100 per cent.

Iron and steel making capacity has been operated to the limit for but a small fraction of the entire period of five years which has elapsed since 1907. In the main, the five years have been a period of relative dullness, but if demand grows while it sleeps, which hitherto has been the case, then it is to be expected that today the real undercurrent of demand should be in relation to the demand of five or six years ago, with an allowance for a normal rate of growth. It is impossible, of course, to compare the present demand with that of any period of activity in the past, for the reason that the demand cannot be measured in tons; of the present it can merely be said that we are making material at a certain rate and the trade calls for more material than this. Productive rates, on the other hand, can be compared.

As to pig iron, in 1906 we made 25,300,000 tons, and in October, 1907, we reached a rate of 28,000,000 tons. Recently we have been making pig iron at the rate of 32,000,000 tons. That is only 26 per cent increase, compared with 1906, six years ago, and only 14 per cent increase compared with October, 1907, five years ago. Steel ingots and castings are being produced at the rate of about 32,000,000 tons a year at present, which is 37 per cent more than the rate in 1906 and about 24 per cent more than the estimated rate in October, 1907.

These increases in pig iron and steel in five or six years are small rather than large, compared with experience in the past. If demand has in recent years been increasing more slowly than formerly, if the old rules have broken down, no more can be said, but it must be proved first that such is the case. Past experience has been that in times of relative depression men think that business will no longer expand as it once did, but when the revival comes, they find that the sway of the rule has been restored.

It may be noted also that there are evidences of a misconception of the quantity of new erection now in progress in the iron and steel industry. If new construction is to be regarded in the light of equalization against an increased demand, then it must be measured not in absolute terms, but in relative terms, in proportion to the existing capacity and demand. New construction involving an annual production of a million tons of pig iron or of steel represents one rate of expansion in a 15,000,000-ton industry, but only half as great an expansion in a 30,000,000-ton industry. Assuming that we have now a 32,000,000-ton industry, whether as regards pig iron or steel

making, new construction of one million tons is only 3.1 per cent. It represents an annual expansion of 3.1 per cent if a given new construction program can be carried out in a year, but this is never done. It represents less than 1.6 per cent annual expansion if two years are consumed in carrying through a given piece of work from start to finish. A conservative average is 18 months for new construction, whereupon it develops that new construction involving one million tons annual capacity represents a rate of expansion of only 2 per cent a year, and the construction program now being carried out, while it probably exceeds one million tons, certainly does not reach 2,000,000 tons. In other words, the present rate of expansion in capacity is probably more than 2 per cent a year, but does not reach 4 per cent, and even 4 per cent would be a small rate, compared with the precedents. Hence, we are justified in concluding that expansion is not now going on at an unreasonable rate. This fact as to the general situation may or may not be helpful to the individual in solving his own problem of whether to expand his business, whose success depends largely on local conditions.

Missing His Opportunity

An echo of the growing sentiment that the most effective method to check the tendency towards semi-socialistic and unfair legislation affecting business interests is in the hands of business men themselves, was sounded on all sides at the recent annual convention of the National Founders' Association in New York. The indifference or hit-or-miss interest of business men in local and district politics was declared by the clearest-thinking among the leaders of the association. Instances were recited where the employer with much at stake has absolutely failed, through contempt of the ways of politics and politicians, of performing his full civic duty at election of congressmen and assemblymen. He may not have abstained from exercising his individual vote, but he has often let it go at that and awaited the usual result with an almost fatalistic frame of mind, when the demagog and the political agitator have been at work.

Being primarily a defense organization, the interest of the National Founders' Association has been directed largely to labor legislation and towards combating the inequalities and unfair restrictions imposed by such acts. The criticism by the association of the inactivity of its own members in politics, however, may be extended to include individual employers generally. Too many instances of their failure to rise to the needs of the occasions are shown in recent primaries, votes upon constitutional amendments and other elections where questions not only of importance now, but of increasing effect in the future, were involved.

There is little or no uncertainty in an issue when on one side is banked a solid, active and organized force, making its views, its desires and even its threats, clear and unmistakable, and while on the other is often a scattered and none-too-assertive opposition. The exigencies of practical politics make the result a foregone conclusion.

There is no doubt that the great body of American voters mean to do the fair thing by all their fellow citizens. If the effect of that action is directly the opposite of this rule, the fault lies not so much with them, but with the lop-sided presentation of an issue which has given them little chance to grasp some of the essentials of a question. Education is therefore the corrective agency and the safeguard for sane and constructive legislation. The position of the employer gives him broad opportunities for the dissemination of economic and practical truths in his own plant. If he is not making the most of his advantage in this respect, the fault is not one of commission by the politician and the demagog and indirectly by the general voting class, but is one of clear omission on his own part. It is time that the business men of the country thoroughly appreciate this fact and act upon it. The final effect will be much more salutary than that gained by deploring the tendency of the times.

Railroad Consumption of Iron and Steel

The re-establishment of railroad buying upon a large scale furnishes further proof of the claim made in these columns in recent years that the railroads do not, in this age, consume nearly as large a percentage of the product of the iron industry as they did many years ago, when the railroads were being built and when the consumption of iron for other purposes was relatively limited. Railroad buying fell off in 1907, and was very small indeed in 1908. In that and subsequent years, there were those who were continually sighing for the "good old days" when the railroads consumed "50 to 60 per cent" of the iron industry's product. Attention was then called to the fact that owing to great changes in conditions, such a proportion could never be restored. On the one hand, the railroads were built and would expand chiefly by way of increasing their facilities, while on the other hand iron and steel products had come to be used in a great variety of ways not thought of in the eighties, when the record railroad mileage was built. Railroad facilities, indeed, would not need to be increased largely unless by an expansion in general business activity which would consume much iron.

Predictions are made that next year's rail production will break the record made in 1906, a trifle under 4,000,000 tons, but even if so, the total steel production will be very much larger than that of 1906, so that in any event the proportion of rails will be smaller. Even with somewhat more than 4,000,000 tons of rail produced, the steam roads need not take more than 3,000,000 tons, for exports are running at about half a million tons a year, and rails are used for general industrial purposes, as well as for trolley lines. If 200,000 cars are built, which would be somewhat more than this year's output promises to be, there would not be absorbed more than 3,000,000 tons of steel products, at the outside, making not over 6,000,000 tons for the two great items. Locomotives, bridges, viaducts, repairs, etc., involve a tonnage small relative to that involved in rails and cars. If all goes as well as expected, there will be produced, in 1913, considerably more than 25,000,000 tons of rolled iron and steel, while the production of iron and steel castings will run the total tonnage to at least 35,000,000 tons. If the railroads should take 10,000,000 tons of this, which is not expected, the proportion would only be between 28 and 29 per cent, while in rolled material alone, excluding castings, the proportion would not be much, if any, over 30 per cent. The proportion of the current output passing directly or indirectly to the railroads is smaller than these percentages. The iron and steel industry does not depend upon the railroads to anything like the extent that it did half a dozen years ago, much less a quarter century ago.

Shipbuilders Discuss Free Trade Provision

Relating to Materials and Machinery — Treasury Gives a Forecast of Regulations to be Announced Soon

(Special Correspondence)

Philadelphia, Dec. 3.—The topic which, as with other ship builders throughout the country, is of most interest to Philadelphia ship builders at present, is the Panama canal bill, which was passed by congress last August. In this connection a representative of THE IRON TRADE REVIEW questioned several of the leading ship builders here as to what they thought would be the effect of this bill on their business, and whether they had any further legislation to suggest.

"We do not ask a thing from congress right now, further than that it shall let us alone," said Joseph W. Powell, assistant to the president of the William Cramp & Son Ship & Engine Building Co. Mr. Powell, although still a young man, has been connected with the ship building business for 20 years and is recognized as an authority on all matters pertaining to the industry.

"If it does that for five years," he continued, "we will be able to convince people in this country that it will be profitable to invest money in ships. This is especially in reference to the Panama canal trade. At present, we are building four large ships for this service and one other builder has in course of construction eight vessels that will trade between the two coasts. If we are permitted to go ahead for five years under the present laws, the beginning of a real American merchant marine will have been made and sufficient experience gained to point the proper way for future legislation.

"We strongly objected to the Panama canal bill as originally passed," he said, "because it admitted foreign built ships to American registry for the foreign trade. We know that the provision for the free entry of ship building materials, inserted in conference, was a sop thrown to ship builders in return for the damage to our position due to this change in our navigation laws, and we are willing to take what advantage we can of this law since congress has shown a desire to help us in this way. But it is a fact that it cannot benefit us to any great extent. When the secretary of the treasury, however, announced that he would so construe the law as to permit a man to go abroad, purchase a vessel, take it apart and then bring it into this country free, on the ground that it was included under ship building materials, we were forced to complain in order to prevent our business from being killed outright.

"These treasury regulations, as they will be issued, however," said Mr. Powell, "have been changed since our protest to overcome this objection and, in fact, now considerably restrict the classes of articles that are entitled to free entry."

Mr. Powell was asked if he thought the free entry clause would prove of advantage to ship builders.

"We have a drawerful of quotations," he answered, "on ship building materials of all kinds from abroad, and, with a few isolated exceptions, we find it will be cheaper to buy the goods here, under the present market conditions."

Unlike other ship builders talked with, De Courcy May, chairman of the board of the New York Ship Building Co., Camden, N. J., has not yet formed a definite opinion as to the merits or demerits of the Panama canal bill.

"What do you think of the bill?" was asked Mr. May.

"I don't know what to think of it," he replied, after a moment's thought. "I do not as yet know what the law means and I don't believe anyone else knows. In fact, the bill was rushed through with other legislation at the eleventh hour and I do not believe congress itself knew just what it meant when it was passed."

"Do you think the provision to permit the free admission of ship building materials is one which will benefit the ship builders?"

"It all depends on what will be included under the term ship building materials," said Mr. May. "If boilers and engines are admitted free it will harm us considerably. I do not believe, however, that such will be the construction put upon this term, or that this law will make it possible to import 'knocked-down' ships free of duty.

"The free admission of ship's hardware and some other materials, the manufacturing cost of which is made up mainly of labor charges, would be of some advantage to us, due to the lower wages which are paid abroad. This, of course, would depend on the conditions in the foreign markets compared with those in the American market."

"Are you then of the opinion that, eliminating the cost of labor in the yards, it still costs more to build a vessel in this country than abroad?"

"Yes," said Mr. May. "You must remember that the labor in the yards is not the only labor item entering into the cost of the ship. There is a labor charge attached to every part of the ship before the materials are brought into the yard."

The treasury department has issued a statement in which it says that the regulations as issued will be somewhat broader than those originally drafted in the customs division and at the same time somewhat more restricted than was at one time contemplated.

Machinery will not be entitled to free entry. Included in the term "machinery" will be auxiliary machinery such as pumps, steam winches, hoisting engines, electric motors and generators and condensers.

The term "outfit and equipment" will be defined as including all portable articles not permanently incorporated in the hull or machinery and will include rigging, tackle, boats, life saving apparatus, wireless apparatus, searchlights, lamps, bedding, furniture, tableware, small arms, etc., but will not include consumable supplies such as coal, food, medicine, etc.

The term "outfit and equipment" will also be held to include not only the original outfitting and equipping, but also renewals and replacements.

Materials will be defined as including merchandise suitable for use in the construction or repair of a vessel, or to be incorporated therein after having undergone a process of manufacture subsequent to importations, or in its condition as imported, provided it has been purchased in the open market and was not constructed or fabricated on a special order or after a special design. This would include raw material such as pig iron and lumber, rough forgings and castings, but not finished ones, nuts, screws, bolts, steel plates, ships' knees, flooring and other things which, though complete articles, are useful as parts in the construction of something else.

MINING NEWS FROM THE IRON RANGES

Exploration on Michigan Ranges

Construction work at the Rogers mine, in the Iron River district, Michigan, and owned by the Rogers-Brown interests, is nearing completion and the mine has been placed in commission. Ore is being hoisted and is going into stock. The mine has the first concrete shaft put down in the Iron River district, necessitated by the overburden, which was 140 feet thick and treacherous. The shaft is 29 feet in diameter, with a rectangular interior divided into four compartments. The ore body lies at a depth of about 1,000 feet, contrary to the old theory that all deposits at the western end of the Menominee range are pockets, lying at a depth of less than 500 feet. Various properties in that region have been abandoned, their ore bodies supposedly having been exhausted, and some of these mines have since been re-opened, and are now producing. After this, the limit of depth was placed at about 1,000 feet, as that at which the maximum of production might be expected, and many properties in the Iron River field were drilled on that theory and abandoned, the Sherwood being an example. The Johnson property at Ice lake is another instance, but the Florence Iron Co. was not satisfied with results there and this year decided to drill the property again. At a depth of over 1,000 feet, a deposit of high-grade ore has been opened under the heavy capping of mixed ore, gray slates, jasper and quartz.

Due in part to the discoveries in the Mastodon field by the Longyear-Pillsbury-Bennett interests, and in the Carpenter lands by M. A. Hanna & Co., considerable exploration is in progress in the Crystal Falls district. The Longyear interests have increased the number of drills at work in Section 13, T. 43-R. 32. It was reported recently that the United States Steel Corporation, operating in the adjoining Section 12, on a tract owned by the Michigan Iron & Land Co., has encountered ore, and favorable reports also have come from the Cleveland-Cliffs Iron Co., drilling in that section. Although the Mastodon country was explored unsuccessfully before, three large mines appear to be in sight now. At the northern rim of the Crystal Falls district, the Nett River field is being tested again. Previous explorers there were the Whitesides interests of Duluth and M. A. Hanna & Co. The Steel Corporation is now at work and the field will be given a more systematic investigation.

The Buckeye mine at Commonwealth, Wis., owned by Oglebay, Norton & Co., of Cleveland, is again in commission and will be worked through the winter at full capacity. The mine has been idle since April, but its stockpile of 50,000 tons was shipped during the summer. To permit necessary and extensive repairs, the Cleveland-Cliffs Iron Co. has closed No. 9 shaft of the Ashland mine, at Ironwood, on the Gogebic range. Good results are reported from the exploratory work of M. A. Hanna & Co. in Section 17, T. 47-R. 45, near Wakefield, on the same range. The ore lies near the surface and churn drills are now being used to supplement the diamond drills. The old Banner property, at the eastern end of the Gogebic range, is to be explored by the Longyear interests, and diamond drill equipment has been sent to the tract. Considerable low-grade ore was found in that region some years ago.

Another Shipper on the Cuyuna

Officers of the Iron Mountain Mining Co., who recently visited the company's properties on the Cuyuna range, stated that the company plans to ship ore next season. The shaft of the mine near Crosby will be enlarged to three compartments to the 130-foot level, and negotiations are underway for the building of a railroad spur to the mine from either the Soo line or the Cuyuna Northern railroad. Considerable high-grade manganese ore is said to be on the dump, taken out in the process of opening the mine. About 25 men will be employed two shifts per day throughout the winter. Several transfers involving property in the vicinity of Brainerd indicate more mining activity in that vicinity in the near future.

First Aid Work

Mine rescue car No. 8, which the bureau of mines has equipped for use on all of the Michigan ranges, arrived in Ironwood, Mich., Nov. 27, and will make that place its headquarters. In anticipation of the arrival of the car, a meeting of mine managers was held a few days before at Ironwood, to make preliminary arrangements for its operation. Among those present were: George H. Abeel and Percy S. Williams, of Oglebay, Norton & Co.; Henry Rowe and Andrew G. Hedin, of the Oliver company; Luther C. Brewer, of the Newport mine; J. M. Davis, Capt. Lukey and W. J. Davis, of Pickands, Mather & Co.; W. E. McRandle, of the Lake Superior Iron & Chemical Co.; and J. M. Bush, of the Cleveland-Cliffs Iron Co. The safety inspectors present were: Mr. Conibear, of the Cleveland-Cliffs company, and W. C. Congdon, of the Newport mine. Messrs. Steidle and Grove, of the bureau of mines at Pitsburgh, outlined briefly the work that the bureau purposes to do through the rescue car. Before adjournment, resolutions were unanimously adopted, in which provision was made for the training of men at each mine on the Gogebic range, in accordance with the work as planned by the bureau, and for the presentation of the bureau's stereopticon views, showing first-aid and rescue work, accidental statistics, etc.

At Chisholm, on the Mesabi range, a demonstration of "first aid to the injured" work was given recently, which was attended by a large number of employes of the Oliver Iron Mining Co., in that district. These demonstrations are meeting with approval from employes. They show the best methods to be pursued in all forms of accidents, preparatory to taking the injured to the hospital, such as bandaging, resuscitating, relief from pain, etc. The meetings are attended by superintendents as well as miners and shift bosses. The local work is in charge of Jesse Madsen.

The Imperial mine of the Cleveland-Cliffs Iron Co., at Michigamme, is expected to resume operations soon.

MEN OF THE IRON TRADE

John H. Davis, superintendent of the steel foundry operated by the Otis Steel Co., Cleveland, resigned Dec. 1.

Walter Wood, of R. D. Wood & Co., 400 Chestnut street, Philadelphia, is expected to return this week from a trip to Cuba.

C. F. Rand, president of the Spanish-American Iron Co., is in Cuba, in connection with the iron ore interests of his company there. He will return about the middle of the month.

W. H. Lewis, Detour, Mich., has been appointed manager of the coal department of Pickands, Mather & Co., at Detour, He succeeds William L. Sherwood, who died Nov. 10.

Charles H. Chester, lately connected with the plants of the Semet-Solvay Co., at North Lebanon and Chester, Pa., has been assigned to the plant at Steelton, Pa., as assistant superintendent.

E. W. Strong is now manager of publicity for the American Vanadium Co., and the Vanadium Sales Co., Pittsburgh. He was formerly with the American Locomotive Co., New York City.

W. D. Barry, who has been manager of the New Brighton, Pa., works of the Keystone Bronze Co., has been appointed general superintendent of both the Pittsburgh and New Brighton plants.

William Jennings, treasurer of the Jackson Mfg. Co., has been elected president of the Commonwealth Trust Co., of Harrisburg, Pa., the oldest trust company in that portion of Pennsylvania.

Guy E. Tripp, chairman of the board of the Westinghouse Electric & Mfg. Co., Pittsburgh, returned this week from a trip to Europe. He spent about three months inspecting foreign plants of the company.

Peter Thilges, connected with the Simmons Mfg. Co., Kenosha, Wis., for the past 14 years, has been named assistant superintendent of the company's plant. For the past 10 years he has been superintendent of construction.

Walter A. Johnson has been appointed manager of the Atlanta, Ga., office of the Independent Pneumatic Tool Co., Chicago, succeeding John J. Keefe, deceased. Mr. Johnson has been Pittsburgh representative of the company.

E. E. Slick, former chief engineer of the Carnegie Steel Co., Pittsburgh, who resigned to become general manager of the Cambria Steel Co., Johnstown, Pa., has been presented a diamond-studded gold watch, chain and charm by Carnegie officials.

C. G. Rowlette, for the last five years general manager of the Chester (W. Va.) plant of the American Sheet & Tin Plate Co., was tendered a dinner a few days ago. Mr. Rowlette, on account of his health, has decided to enter another line of work.

James W. Galvin, assistant superintendent of the open-hearth department, Inland Steel Co., Indiana Harbor, Ind., has resigned to become superintendent of the open-hearth department of the new open-hearth plant of the Alton Steel Co., Alton, Ill.

HERBERT P. HOWELL

Former Assistant to the First Vice President of the Carnegie Steel Co., now an High Official of a New York Bank.

Thomas A. Edison, has assumed the presidency of the various companies manufacturing and handling the Edison inventions at West Orange, N. J., vice Frank L. Dyer, who has resigned. It is declared in an official statement that Mr. Edison desires to assume personal supervision of the companies' policies in the future. Heretofore he has been only a director.

G. M. Pott, of St. Louis, has been named master mechanic of the Mahoning Valley works of the Republic Iron & Steel Co., Youngstown, O., as successor to George C. Ashworth, who has held the position for the past three years.

E. O. Murray, F. C. Yeates, W. B. Enck, Harold Masters and William McGee are among the employes of the Cambria Steel Co., Johnstown, Pa., who have moved to Pittsburgh as a result of the location of the freight and purchasing departments in that city.

Anthony Baker, who is superintendent of the Oneida street foundry of the Stearns Hardware Mfg. Co., Syracuse, N. Y., will be superintendent of the Economy foundry, recently leased by E. C. Stearns & Co., that city. He will be succeeded in his present position by Stephen Blackford.

C. F. Chase, who has been manager of the stationary engine department of the M. Rumely Co., La Porte, Ind., has been appointed sales manager of the gas engine department of the Falk Co., Milwaukee, Wis. He was formerly associated with the International Harvester Co. for many years.

Thomas Neal, who has been president of the General Motors Co. for the past two years, has resigned to become chairman of the board of directors. He is to be succeeded by Charles W. Nash, of Flint, Mich., manager of the Buick Motor Car Co. Mr. Nash was elected a director of the board, succeeding James N. Wallace, who declined re-election.

Herbert P. Howell, assistant to the first vice president of the Carnegie Steel Co., and one of the best known men in the iron and steel trade in the Pittsburgh district, has been elected to the vice presidency of the National Bank of Commerce, of New York City. He will leave the Carnegie company at the end of the year and will have charge of the commercial credits of the New York bank after that time. The rise of Mr. Howell in the iron and steel

MEN OF THE IRON TRADE

world has been both remarkable and interesting. After clerking in a Westmoreland county (Pa.) country store for some time, his ambition took him to the city. He joined the ranks of the Carnegie company in 1889 as a clerk and got his early training with the night force. After spending about a year at this work, he was transferred to the sales department and subsequently took charge of the order end of this work. In 1896 he was appointed assistant to the credit manager of the company and five years later, Mr. Howell was appointed credit manager, which title has since been changed to assistant to the first vice president. During the past few years, he has been directly associated with H. P. Bope. Mr. Howell's successor has not yet been announced.

W. A. KEIRN

Who Was Re-Elected Treasurer of the Pittsburgh Publicity Association. He is Advertising Manager of the Mesta Machine Co.

R. L. Woodward has been appointed manager of the New England branch of the Strong, Carlisle & Hammond Co., Cleveland, the office of which was recently moved from 180 High street to 200 Congress street, Boston. The new store has a large floor space, which will make possible the carrying of a complete stock of Strong steam specialties and Frankfort furnaces. It is located in the center of the business district.

W. E. Koop, of the Louisville (Ky.) Drying Machine Co., Garland Mourning, of the Abell Elevator Co., Louisville, and W. P. Davis, manufacturer's agent and dealer in iron and steel, also of that city, have been elected to membership in the Louisville Rotary Club, an organization the membership of which is limited to one representative of each line of business in the city.

W. A. Keirn, advertising manager of the Mesta Machine Co., Pittsburgh, has been re-elected treasurer of the Pittsburgh Publicity Association. J. C. McQuiston, advertising manager of the Westinghouse Electric & Mfg. Co., the retiring president of the organization, was prsented a hand bag containing a silver mounted traveling set in recognition of the work he has performed for the association. The election was held Nov. 29.

Frederick L. Lambert, for nine years superintendent of the foundry department of the Fairbanks-Morse Mfg. Co.'s Eclipse works, at Beloit, Wis., has resigned to accept the position of assistant superintendent of the Dodge Mfg. Co., Mishawaka, Ind. Mr. Lambert was associated with the Fairbanks-Morse Beloit works for 18 years. Associates presented him with a watch, chain and charm in token of their esteem.

William E. Hartman has resigned his position as managing engineer of the H. Koppers Co., Chicago, manufacturer of by-product coke ovens. Some additional changes have also been made in the organization and the list of officials is now as follows: President, H. Koppers; first vice president, John C. McMath; second vice president, Thomas V. Salt; chief engineer, Allan Strale; secretary and treasurer, Joseph M. Butler.

Clarence A. Earl has been elected president of the Universal Machine Screw Co., New Britain, Conn., which was recently purchased by the American Hardware Corporation. He is manager of the Corbin Screw division of the American Hardware Corporation, and was formerly vice president of that company. F. Goodwin Smith, Hartford, Conn., has been chosen secretary and treasurer. The board of directors comprises the president and treasurer, with Col. C. L. F. Robinson, Hartford, president of the Colt's Patent Fire Arms Mfg. Co.; S. C. Dunham, Hartford, president of the Travelers' Insurance Co., and Col. Charles M. Jarvis, president of the American Hardware Corporation.

F. A. J. FitzGerald, formerly chief chemist of the Carborundum Co., at Niagara Falls, N. Y., spoke recently at Franklin Institute in Philadelphia, on "Experimenting with the Electric Furnace." Mr. FitzGerald, a leading authority in this country on electric furnaces, illustrated his talk by lantern slides and by an exhibit of electric furnace products. The lecture was well attended by metallurgists who have followed Mr. FitzGerald since he became engaged in private practice. "Electric furnaces," he said, "are coming more and more into use owing to their economy in comparison with fuel furnaces. This economy is manifest not only in regions where energy from water power is much cheaper than from coal, but also in such districts where the electric energy is obtained from coal."

J. C. McQUISTON

Advertising Manager of the Westinghouse Electric & Mfg. Co., Who Retires as President of Publicity Association

BRITISH IRON TRADE

Office of THE IRON TRADE REVIEW,
Prince's Chambers, Corporation St.,
Birmingham, Eng., Nov. 23.

Pig Iron.—Prices on pig iron have hardened, and Cleveland warrants last week reached the highest price for the past 12 years. Although the improved outlook in the near east is ascribed for the advance, the real influence is the enormous demand, and which is likely to increase. A number of contracts have been placed at prices well above recent quotations. In the Cleveland district yesterday, transactions were on the basis of £68 1s ($16.66), a penny lower than the previous day. The price advance during the week was nearly 2s. The amount now held in store is 253,000 tons. In the Birmingham district, foundry iron of a low grade was sold at an advance of 3s. The increase of 5s in the price of finished steel has hardened the market for raw material. The demand of the Cumberland district greatly exceeds the output of the 20 blast furnaces.

Finished Steel and Iron.—Steel plates and sections have been advanced 5s by the associated makers of the Midlands, the north of England and Scotland. The association has used its influence for some time to restrain prices with a view of keeping out foreign competition. This competition has not been in evidence to any great extent, although it is possible to buy in Germany at lower prices, as the Germans are unable to satisfy their own requirements. It is reported here that the largest steel works in Germany is on the point of closing down, owing to a coal shortage caused by the railway congestion incident to the Balkan war. From Sheffield, it is reported that the United States is buying more high class steel every week, with exports of steel and steel goods to France and Germany on a larger scale than ever. Large orders have also been received from Canada, India, Japan, Australia and South Africa. Wrought iron is not quite as strong as steel, although there are plenty of orders on the books. This condition is due to the fact that consumers restrict their buying to only urgent requirements. Price concessions will not be made, however, as the ascertainment of the wages board, which will probably be published next week, will carry another increase in wages. Tin plate is very firm. Ship builders are expecting that a number of battleships will be ordered within a short time, and several of the large works are making extensions to meet this prospective business. Among reports issued by several companies are the following: Cargo Fleet Iron Co., with a profit of £105,000, an increase of £20,000 over last year; South Durham Steel & Iron Co., a profit of £210,000; Askam & Millom Hematite, a profit of £58,000. The Midland Iron Co. has declared a dividend of 5 per cent.

LARGE IMPROVEMENTS

To be Made by Lake Superior Corporation at Soo Plant.

The steel plant of the Lake Superior Corporation at Sault Ste. Marie, Ont., is to be greatly extended at once, at a cost of several million dollars. Another blast furnace will be built and the coking plant increased. Other activities will be proportionately enlarged. Land has been bought by the corporation to permit of extensions.

Ore Shipments Decrease

Considerably less iron ore was shipped from the province of Ontario during the first nine months of 1912 than during the corresponding period last year, according to returns furnished by the Ontario government. The reduction in the production of the province totals 136,603 tons. The output of pig iron, however, shows a large increase, being 452,021 tons, as against 296,856 tons last year.

Obituaries

Loyal T. Ives, who in 1872 founded the Loyal T. Ives Needle Works, New Brunswick, N. J., which manufactures a large portion of the world's output of knitting machine needles, died at New Brunswick, Nov. 30, after a number of years' illness of paralysis. He was aged 69.

Angus G. Mackay, president of the J. L. Morrison Co., New York City, and a pioneer in the manufacture of book binding machinery, died at Brooklyn, Dec. 1, at the age of 77. He not only invented book-binding machines, but acquired valuable patents for his company when the demand was small.

Joseph Davenport, who built the first locomotive pilot in 1840 and is credited with building the first wrought iron cantilever bridge and the first locomotive engineer's cab, died Nov. 28, at his home in Massillon, O., aged 97 years. The pilot was built for the Boston & Lowell railroad as a snow plow and had boards on the side to shove the snow away. Its success in preventing cows being run over, led to its general adoption.

NICKEL PLANTS

Show Large Increase.—Demand for War Material.

Ottawa, Can., Dec. 3.—Large increases in existing nickel plants and the construction of new ones at Sudbury, Ont., are at present in progress as a direct result of the demand for nickel steel in war material following recent European unrest. Where two or three years ago the Canadian Copper Co., the greatest producer of nickel in the world, was carefully nursing the market for fear that the supply would be greater than the demand, it is now buying new ranges and enlarging its operations in an endeavor to supply its orders.

Although it has already large ore resources, the company has just bought part of the Northern range from the Lake Superior Power Co. It is also opening up the Froude mine and other old workings which have been allowed to lie idle for years. Its example is now being followed by other companies where once it held undisputed dominion. The Mond Nickel Co., which has been shipping small quantities of nickel to England for some years past, is putting up a large and up-to-date smelter and will carry on operations on a much larger scale. The Dominion Nickel Co. will build a new smelter at Cobalt. This company has for years held valuable properties such as the Whistle and Murray mines, but only lately has the market for the ore broadened enough to warrant it to enter into competition with such a formidable competitor as the International Nickel Co. M. J. O'Brien, the Renfrew, Ont., millionaire, and J. R. Booth, the Ottawa lumberman, are the principal stockholders in the new company.

Baritone at the Forge

Titta Ruffo, the world-famous baritone, was the guest of Alba B. Johnson, president of the Baldwin Locomotive Works, recently. Work at one shop of the works was suspended for at least half an hour while the baritone took off his coat, rolled up his sleeves, stood before a blazing forge and with admirable dexterity fashioned from a red hot bar a cornucopia, which he afterward presented to Mr. Johnson. Fifteen years ago, Ruffo was working in his father's iron foundry in Rome earning but 2 francs a day. His present salary is $2,000 a night.

LATEST MACHINERY NEWS COLLECTED IN LEADING MANUFACTURING CENTERS

In New York, the machinery business continues active. While the orders booked last week, did not aggregate as large a total as in some recent weeks, dealers there see no cause for anxiety. The tendency to hold off buying equipment at this season, when conditions will permit it, is considered as an abnormal feature of year-end trade. New York dealers will not consider it an unfavorable sign respecting the future if, from now until Jan. 1, 1913, the volume of business declines. The New York Central & Hudson River railroad has submitted a small list of shop equipment and the manufacturing industries in the east have a large aggregate of inquiries out for small lots of machinery. Eastern dealers are basing their optimism regarding a continuance of good business through next year on the fact that general conditions are better at the end of this year than at the close of either 1910 or 1911.

In Pittsburgh, machine tool builders advise that a fair volume of business is being enjoyed despite the fact that the market is experiencing somewhat of a lull. There has been a good demand for shears. The Chicago, Burlington & Quincy railroad, the E. L. Essley Machinery Co., Chicago, the Muskingum Iron & Metal Co., Zanesville, O., and the Berwind-White Coal Co., Philadelphia, are among the concerns to recently close negotiations for shears of various sizes. There has been a good demand for condensers and gas producers. Sellers of second hand machinery have had considerable call for single tools.

In Cleveland, the slackening in the machine tool trade, which has been in evidence for several weeks, continues and there is a decrease from the heavy volume of orders apparent since July. Some dealers report a satisfactory aggregate of business closed and pending. Other dealers, however, report a big drop, this condition holding true with some who previously have been enjoying good business. Reasons ascribed for the lull are the uncertainty of some business men relative to congressional action on the tariff, which has caused the postponing of plant improvements, and to the usual dullness of the closing months of the year.

In Cincinnati, the machinery market export business is the best at the present time, but domestic trade is expected to improve after the first of the year. Several large machine tool lists, now pending, will probably be closed by that time, and there are rumors that two or three railroads will also be in the market for a large number of tools within the next month or so. Most of the business at present is for single orders, of which a large number are coming from railroads. From general reports received from machine tool makers in that territory, November was about equal to October in the amount of business transacted. Neither month, however, was as good as either August or September.

New Construction

The Union Malleable Co., East Moline, Ill., is erecting a 65 x 82-foot addition to its foundry.

The plant of the J. V. Pilcher Mfg. Co., Louisville, Ky., which company manufactures sheet metal novelties, will probably be enlarged in the near future.

The Wedgerite Chemical Co., Louisville, Ky., intends to build a factory near that city for the manufacture of its product as soon as a site can be decided upon.

The Halcomb Steel Co., Syracuse, N. Y., expects to have the two additions being made at its plant completed by Jan. 15. Both will be used for the manufacture of wire.

The Carolina, Clinchfield & Ohio railroad has purchased at Elkhorn City, Ky., 40 acres which it will utilize as a site for car and machine shops.

A factory will be erected at Brantford, Ont., by the Chapin Auto Cycle Co., which will cost $10,000. The company will employ 150 skilled mechanics.

The Crosby Co., Buffalo, N. Y., has let the contract for the structural steel for a power house to be erected at the company's plant at Pratt street.

An addition estimated to cost $50,000 will be erected by the Superior Foundry Co., Cleveland. The new structure will be 90 x 300 feet and will contain the machine and pattern-making departments.

The General Electric Co. is building an addition to its plant at Syracuse, N. Y., consisting of a storage house and a repair shop. The building will be 102 x 200 feet, one story, and will cost $56,000.

It is reported that the Oxford Copper Co., Bayonne, N. J., is having plans prepared for an extensive copper working plant near Chrome, N. J. The company recently purchased a large tract of land near that place.

It is reported that the Louisville & Nashville railroad will establish and equip car shops at Irvine, Ky., to which point it is now constructing a line from Winchester. The general offices of the company are in Louisville, Ky.

The Detroit Chair Co., Detroit, Mich., is planning with Daniel F. Murphy, of the real estate department of the Fidelity & Columbia Trust Co., Louisville, Ky., the establishment of a chair factory at the latter city. The site has been selected.

The contract for the new factory to be erected by the Guide Motor Lamp Co., Cleveland, on Madison avenue N. W., near West 114th street, has been awarded to the Uhl-Jaster Co. The building will be of brick, steel and reinforced concrete, two stories, 60 x 130 feet.

The American Brass Co., Waterbury, Conn., has awarded the C. T. Wills Co., New York, the contract for the erection of an office building at Grand and Meadow streets. The building will be of brick and steel,

68 x 231 feet, three stories, with basement.

Plans have been filed in New York for a four-story brick factory 200 x 205 feet and an extension 54 x 51 feet, to be erected on Freeman avenue, Long Island City, for the Arrow Motor Co. Construction work will be started at once. The estimated cost of the structure is $300,000 and equipment will approximate $200,000.

The Goodyear Improvement Co., a subsidiary of the Goodyear Rubber Co., has filed plans at the New York building bureau for a large manufacturing plant to be erected on Jackson avenue, Long Island City. The structure will be 52 x 268 feet and four stories high. It is estimated that it will cost $225,000.

The Duryea Mfg. Co., Hoboken avenue, Jersey City, N. J., has purchased a factory site in the Greenville section of that city, and will commence building operations at once. The property is situated on the New York bay shore and the Lehigh Valley railroad and measures 219 x 220 feet.

William D. Harper, building inspector of Milwaukee, Wis., has granted a permit to A. L. and Harold D. Richards for the erection of the 11-story Hotel Wisconsin, to be built at 174-178 Third street, that city, at a cost of $365,000. It will be of steel and concrete construction. The Raulf Construction Co. has been awarded the general contract.

Municipal asphalt repair plants are being built by the Hetherington & Berner Iron Works, Indianapolis, for the cities of Chicago, Detroit and Camden, N. J. The Detroit plant is being built as an addition to the one operated successfully there for the last nine years, while the Chicago plant will be one of the largest of its kind in the country.

Announcement has been made by Col. A. D. Davidson, land commissioner of the Canadian Northern railway, that arrangements are completed for the immediate construction of car building shops at Port Mann, B. C. The plans provide for machine shops, repair shops for cars and locomotives, storehouses, lumber sheds, yard, etc.

Three buildings will be erected by the Standard Machinery Co., 7 Beverly street, Providence, R. I., on a new site of six acres, in Auburn, R. I. The new location is on the Shore Line division of the N. Y., N. H. & H. railroad, and is about four miles from the present quarters at Providence. The new plant will comprise the main building, 175 x 350 feet; a forge shop, 100 x 100 feet; a boiler and engine house, 60 x 60 feet. Ground will be broken within a week and the company expects to occupy the new plant next spring. The new quarters will be three times the size of the company's present plant. A power plant, including engines and boilers, will be installed, as well as a new electric crane and steam hammers.

The Hart-Hutchinson Co. has secured an option on about 45 acres in New Britain, Conn., fronting on the tracks of the New York, New Haven & Hartford railroad. If the transaction is completed a large manufacturing plant will be erected. The company recently purchased the locker manufacturing rights from the Hart & Cooley Mfg. Co.

Abram P. Morris, president of the Second Hand Machinery Co., Newark, N. J., has purchased an additional plot, 95 x 103 feet, on Chestnut street. This places practically the entire block under control of the company to be used as a factory site. A building, four stories high, of brick and stone, will be erected in the near future.

F. P. Sheldon & Son, Providence, R. I., are the architects under whose supervision additions are being made to the weave shed and spinning mill of the Brookside mills, Knoxville, Tenn. A large additional installation of spindles, looms and power equipment will be made. Sullivan & McNally Co., Paterson, N. J., are handling the construction work.

The Insley Mfg. Co., manufacturer of contractors' supplies and industrial equipment, Indianapolis, will erect a two-story factory, 90 x 240 feet, of fire proof construction, at Olney and Lasalle streets and the belt railway tracks, that city. The estimated cost is $15,000. The company recently suffered severe damage by fire at its plant on South Meridian street. The new site comprises 4.31 acres.

The Inland Iron Co., Fresno, Cal., advising in reference to the report that it would erect a manufacturing plant, states that such is not the case as its business is exclusively wholesale iron, steel and heavy hardware. The company will erect a five-story building, 50 x 150 feet, of brick and steel construction, to cost approximately $30,000, for the purpose of conducting its business.

A galvanizing plant will be constructed by the Riverside Foundry Co., Kalamazoo, Mich., immediately. It will be equipped to do general work. Homer Manvel is president of the company. Other officers are: M. J. Bigelow, vice president; J. S. Rockwell, secretary and treasurer; Charles E. McKinstry, general manager. The board of directors comprises the officers and W. N. Pomeroy and Ella D. Lewis.

Shops will be erected by the Hydraulic Pressed Steel Co., 3152 East Sixty-first street, Cleveland, on three acres of a tract of six acres just purchased by that company between East Fifty-fifth street and Bellford avenue. The land has switch tracks from the Pennsylvania and Erie railroads and is well located for a steel plant addition. C. W. Scofield, secretary, states that the other three acres will be reserved for future use.

The Conneaut Shovel Co., Conneaut, O., which recently increased its capital stock from $25,000 to $150,000, advises that it has started the erection of a shovel plant, and has the foundations all in. This plant will be 246 x 500 feet, of saw-tooth construction, and equipped with individual motor-driven machinery. The company will be in the market for a complete line of shovel machinery for making strap back shovels, and a generating unit of from 150 to 200 horsepower.

Machine Tools

The list of machine tools sent to New York dealers by the New York Central & Hudson River railroad includes the following: One bending roll, one vertical punch, one flue cutter, one flue welder and a large blower.

Power Plant Equipment

The Troy Gas Co. will spend $100,000 for new equipment for its power plant in Troy, N. Y.

Kamloops, B. C., has called for tenders for 1,000 horsepower steam, pumping and electrical equipment of the new power station for that city.

Regina, Sask., will next year spend $115,000 on its requirements for street lighting and materials in connection with its power plant and distribution system. About $80,000 will also be spent on an ornamental street lighting system.

Bids will be received by the bureau of yards and docks, Navy Department, Washington, D. C., on Dec. 14, for two 75 kilo-volt-ampere steam-driven alternating-current generating sets and switchboard, for delivery at the Brooklyn Navy Yard.

The Winnipeg board of control is asking for tenders up to Dec. 16 for the delivery and erection in the power house at Point du Bois, near

Winnipeg, of two units horizontal shaft turbines and governors, and three units horizontal shaft turbines and governors.

The West Penn Traction & Water Power Co., Pittsburgh, has completed arrangements for the equipment of its new 40,000-kilowatt hydro-electric plant, the first of a series of developments on the Cheat river, at the Pennsylvania-West Virginia line. The electrical apparatus includes four 10,000-kilowatt Allis-Chalmers vertical water-wheel type alternators, two 300-kilowatt motor-generator exciter sets and accessories of the same company's design. The territory to be served by this system completely encircles the Pittsburgh industrial district and current will be furnished for electrical operation of many coal mines, etc. This system extends as far as Derry on the east, Kittanning and Butler on the north, Aliquippa, Ambridge and Wheeling on the west, and Waynesburg, Uniontown and Connellsville on the south. It involves 259 miles of 110,000-volt lines.

Water Works

The $25,000 bond issue recently voted at Bedford, Ind., for waterworks improvements, has been sold at a $50 premium, and the contract for the necessary work and machinery will be let at once.

New Incorporations

(In order to assist the post office in delivering letters to new concerns, it is suggested that the names of incorporators be written in the lower left hand part of every envelope addressed to such new companies.)

The following manufacturing companies have filed articles of incorporation:

New Foundry Mfg Co., of Sioux City, Iowa, $50,000; incorporators, D. C. Skull, E. Root and C. M. Stillwell.

Odorless Gas Heater Co., Cincinnati, O., $10,000; Rud. H. Hynicka, Henry A. Verhaga, Lawrence Poland, W. H. Sweeney, John E. McGuin.

Crane Spring Steel Fence Co., Cleveland, $25,000; R. J. Crane, R. T. Forrest, H. E. Fenton, M. F. Normile, C. N. Fenton.

Hancock Foundry & Machine Works, Hancock, Md.; $6,000; by H. Nathan Rosen, F. Wilbur Bridges, William H. Dodson.

H. Merrimac Foundry Co., Lawrence, Mass., capital stock $150,000; directors, B. G. A. Rosentwist, president; Ivar L. Sjostrom, treasurer; P. R. J. Sjostrom.

The Rogers Mfg. Co., Toledo, O., manufacturing and dealing in machinery, mechanical devices and appliances; $25,000; Walter Rogers, C. V. Webb, F. J. Dalton, W. I. Webb, Elmer E. Davis.

Viney-Greer Co., Pittsburgh, capital, $25,000, to manufacture parts of refrigerators, etc., chartered by M. N. Greer and George Viney, Pittsburgh; H. G. Budd and J. T. Anderson, Oakmont.

George H. Mason Co., Boston, Mass., to deal in metal products, etc. Capital stock $300,000; directors, William G. Means, Wenham, Mass., treasurer; Lucas L. Smith, Edward C. Bates.

The Scallan Supply Co., Cincinnati, O., materials and supplies for millwrights, machinists, engineers, contractors, etc.; $10,000; Joseph A. Scallan, Thomas M. Scallan, Wm. A. Geoghegan, Edward H. Shields, Edward J. Gracy.

Northway Motor Co., of Cincinnati, O., automobiles and engines; capital stock $600,000; Ralph E. Northway, William Pabodie, Hartwell, O.; Wesley D. Fruste and Edward E. Decebach, Cincinnati, and F. B. Enslow, Huntington, W. Va.

Steel Products Enameling Co. Inc., Farmingdale, N. Y. Manufacture steel, etc., $91,000; incorporators, W. B. Walsh, Brooklyn, W. E. Kelly, W. L. Glenn, New York City.

Eastern Tool & Mfg. Co., Newark, N. J., mechanical engineers, machinists, etc.; capital $50,000; incorporators, Alfred G. Anderson, Carl B. Paterson, Adolf Mentan, F. Wm. Knolhoff, Wm. Traff, C. R. Anderson, all of 74 Richmond street, Newark, N. J.

Allegheny Foundry & Machine Co., Glessner, Allegheny county, Pa.; capital $30,000, general foundry and machine work, chartered by E. H. Hennerdell, D. J. Nicholas, T. N. Gummert and John Gunderman, Tarentum; J. C. Graham, Butler, and Jacob C. Dick, Hite.

New Buyers

A. R. Gibson, Thomas W. Potts and M. T. Healy have incorporated the Commerce Lock & Seal Corporation, at Chicago, with a capital stock of $150,000.

Automobile accessories will be manufactured by the Hanway Starter Co., Chicago, recently incorporated for $75,000, by J. D. Rourke, R. C. Nicholson and I. Goldstein.

The Engle Battery Co. of Canada, Ltd., Quebec, Que., has been incorporated at Ottawa, Can., with $100,000 capital to manufacture and deal in all kinds of electrical apparatus and machinery. Its incorporators are Antonin Galipeault, K. C., Louis Stephen St. Laurent, Hector LaFerte, Pauline Vallee and Cecile Gingras, all of Quebec.

The Fort Brass Foundry Co., capital $3,100, has been organized at Nashville, Tenn., by James B. Fort, Frank Foster and L. N. Fort, all of that city. Equipment for a small plant will be required.

The Vacuum Ice Machine Co. has been organized at South Bend, Ind., for the manufacture of ice machinery. H. F. Wills, G. H. Alexander and William F. Eger are interested in the company, which is capitalized at $25,000.

The Gum Price Motor Truck Co., Chicago, has been incorporated with a capital stock of $100,000. The incorporators are Harry E. Rice Jr., Walter C. Haight and Paul Corkell. The company proposes to manufacture automobiles, trucks and supplies.

William Kahl, 1429 East Terrace avenue, John B. Runner, 14 North Beville avenue, and C. H. Halt, all of Indianapolis, have organized the Standard Tool & Mfg. Co. A line of patented tools will be manufactured. The company is capitalized at $130,000.

The Youngstown Seamless Tube & Iron Co., Youngstown, O., was incorporated last week for the manufacture of seamless tubing after a process devised by Frank E. Simpkins, a roller of considerable experience. The capital stock is $40,000. Incorporators are: Frank E. Simpkins, H. W. Lindsay, J. W. Wicks, R. H. Miller and J. M. Thomas.

United Railway Supplies, Ltd., Montreal, Que., has been incorporated at Ottawa, Ont., with $20,000 capital stock by Eratus Edwin Howard, Henry Udolphus Paget Aylmer, Jacob Dewitt, Wilbert Harvard Howard and Orville S. Tyndale, all of Montreal. It will manufacture and deal in iron, steel, metals, rails, machinery and tools, locomotives, railway cars, etc.

The Fyfe Scale Co., Ltd., Montreal, Que., has received incorporation at Ottawa, Ont., to manufacture, buy and sell all classes of weighing and measuring machinery. It will have a capital stock of $10,000. The incorporators are as follows: John Augustine Mann, Cecil Gordon MacKinnon, Thomas Barnard Gould, Henry Robert Mulvena and Thomas Joseph Coonan, all of Montreal.

The business of ironmakers, steel makers and converters, smelters, engineers, tin plate makers and iron founders will be carried on by the Dominion Wheel & Foundries, Ltd., recently incorporated with a capital

stock of $250,000. The main office will be located at Toronto, Ont. Garard Ruel, Reginald Herbert Montague Temple, Samuel Percy Biggs, William Watson Evans, Robert George Osborne Thompson, all of Toronto, are the incorporators.

The Guarantee Plumbing, Heating & Ventilating Co., Ltd., Montreal, Que., has been incorporated at Ottawa, Ont., with $10,000 capital, to conduct a plumbing, steamfitting, roofing and sheet metal business and to manufacture and deal in hardware, metal and waterworks' supplies, etc. The incorporators are William Henry Dunn, Maissonneuve, Que., John Stopford, Andrew Hall, Samuel Macbeth and William Kilgour, all of Montreal, Que.

Authority to do business in New York state, with offices at Colonie, has been secured by the Eastern Malleable Iron Co., recently organized with a capital of $10,000,000, under the laws of Connecticut, with offices at Naugatuck. The abbreviation "Inc." will be used in connection with the title in New York. August Veghte and William Vleicher, both of Troy, N. Y., John E. Walker, Wilmington, Del., and Harry Whitemore, Naugatuck, Conn., are the incorporators.

The Northway Motor Co., which was recently incorporated in West Virginia with a capital stock of $600,000, to manufacture automobile mottors, will locate in Cincinnati, O., as soon as a factory site can be secured. It is expected to begin an active manufacture of this product shortly. Ralph E. Northway, Wyoming, O., a suburb of Cincinnati, is president of the new company, and the other incorporators are as follows: William Peabody, Hartwell, O.; W. D. Furste and E. E. Decebach, Cincinnati, and F. B. Enslow, Huntington, W. Va.

The National Saw & Forge Co., Ltd., Ottawa, Ont., has just been incorporated to carry on business as manufacturer, dealer and importer in band, gang and all other kinds of saws, bits, planer knives, etc.; cutlery, guns and other firearms, electric and gasoline motors and tools and drop forgings and a general foundry and machine shop business. It will have $500,000 capital and the following incorporators appear: Senator N. A. Belcourt, John A. Ritchie, Edgar R. E. Chevrier, Arthur W. Guertin and R. M. Bobier, all of Ottawa.

O. H. Watkins, Clinton, Ia., and F. J. Fisher, Kenosha, Wis., have purchased the machine shop of Oley & Hunter, 212 West Main street, Kenosha, and will, for the present operate it as an experimental shop for the designing and production of automatic machinery. Mr. Watkins is a well known designer of automatic machinery for spring bed and special machinery, and Mr. Fisher was for 10 years manager of the former Windsor Spring Co., Kenosha. They hold many valuable patents on automatic machinery and equipment which will be perfected and marketed.

General Industrial

An increase in capital stock from $10,000 to $40,000 has been made by the Polo Machine Co., Polo, Ill.

The E. L. Essley Machinery Co., Chicago, has recently placed an order for a No. 3 shear.

The Muskingum Iron & Metal Co., Zanesville, O., has installed a No. 18-inch shear in its plant at that city.

The Pressed Steel Products Co.'s new plant at Sharon, Pa., will be in operation soon after Jan. 1.

The machinery and equipment of the Helmer Bros. Printing Co., Rockford, Ill., has been purchased by the Rockford Plating Works, that city.

The Sofranscy Co., Allentown, Pa., has recently installed a No. 2 shear to cut up to 5 x 5 inch square soft cold steel.

Street railway extensions and improvements to cost $500,000 have been decided on by the Calgary, Alta., city commissioners.

The Edward Ford Plate Glass Co., Rossburg, O., has ordered two 7-foot emery grinding pans from the Thomas Carlin's Sons Co., Pittsburgh.

The city of Moose Jaw, Sask., has called for tenders for the construction and erection of a steel bridge of 145-foot span across the Moose Jaw river.

The Braeburn Steel Co., Braeburn, Pa., has completed the installation of two 9-foot gas producers. The Amsler Engineering Co., Pittsburgh, had the contract.

The Fafinir Bearing Co., New Britain, Conn., which bought out the ball-bearing business of the Hart & Cooley Co., is to increase its capital stock from $100,000 to $200,000.

The Morgan Engineering Co., Alliance, O., has received a contract from the Republic Iron & Steel Co., Youngstown, O., for a 150-ton ingot stripper.

A factory for the production of a portable derrick, invented by Thomas F. Moore, is planned at Winchester, Ky., by the inventor, who has other business interests there.

L. Straub, Lancaster, Pa., has bought at auction in that city for $22,500, the Dissinger Mfg. Co.'s foundry and machine shop. Mr. Straub was formerly president of the Rivetless Chain Co., Avon, Pa.

The new mills of the Apollo Steel Co., Apollo, Pa., will be driven by electric power. The company has closed negotiations with the West Penn Traction Co. to supply the current.

The American Plate Glass Co., Kane, Pa., has placed a contract with the Amsler Engineering Co., Pittsburgh, for five 11-foot gas producers complete with 24-inch gas and 36-inch air combination reversing valves.

The Allegheny Valley Foundry & Machine Co., Glassmere, Pa., will be in operation about Jan. 1, it is officially stated. The new plant, modern in every particular, is adjacent to the Allegheny Plate Glass Co.'s plant.

Machinery is being installed at the new plant of the Automatic Sprinkler Co., Youngstown, O., which is rapidly nearing completion. The main building is of brick, steel and concrete construction, 240 x 300 feet.

J. G. White & Co., Inc., 37 Exchange place, New York, reports that the London, Eng., house of the same name has been awarded the contract for building a railway in Argentina, South America, to cost $4,000,000.

The Southern Photo Mount Mfg. Co., Louisville, Ky., which makes a metal specialty, has been adjudged bankrupt. Liabilities of the concern were about $2,500, while assets approximated $2,000.

A receiver's sale in bankruptcy was held on Dec. 2, at the plant of the Keith-Gara Co., Thirty-first and Ludlow streets, Philadelphia, of the entire stock and machinery of the company. Metal goods and ornaments were manufactured by the company.

Announcement has been made that the plant of the Mascot Stove Mfg. Co., which is located at Dalton, Ga., has been purchased by J. F. James, Chattanooga, Tenn., who is planning the removal of the foundry to Chattanooga.

The Lavigne Gear Co., Racine, Wis., manufacturer of steering gears, advising in reference to the report that it was planning the erection of a plant at Racine, states that up to this time no plans in that direction have been made.

Work has been resumed at the old iron mill operated by McNeal & Co., Louiston, Pa., at Hollidaysburg, Pa. The plant has been idle for some time. Demand for wrought iron products caused the owners to decide to resume operations.

The Thomas Carlin's Sons Co., 1600 River avenue, Pittsburgh, has recently shipped a No. 18 shear, to cut up to 2¼-inch steel, to Edward

McMullen, Washington, D. C. and a No. 18 shear to the Berwind-White Coal Mining Co., Philadelphia.

The Western Launch & Engine Works, Michigan City, Ind., has been placed in the hands of a receiver. This action followed the filing of a petition by Dr. Frank R. Warren, a heavy stockholder in the company. Charles Wolff has been appointed receiver.

A 3,000-kilowatt Curtis condensing turbo-generator with 35-kilowatt non-condensing turbo-exciter and switchboard apparatus is being installed in one of the Pittsburgh power plants of the Carnegie Steel Co. The General Electric Co. is supplying the unit and making installations.

An order has been placed with the Virginia Bridge & Iron Co., by the Louisville & Nashville railroad, for 5,000 tons of structural steel. This will be used in constructing six new bridges on the lines now being built between Winchester and Irvine and between Beattyville and Athol, Ky.

Property rights of the Pressed Radiator Co. of America, West Pittsburgh, Pa., have been transferred to Frederick C. Perkins by the Fidelity Title & Trust Co., Pittsburgh, trustee for the bond holders, for a consideration of $200,000. The plant of the company has continued to operate.

The Carbon Steel Co., Pittsburgh, has installed chain grate stokers in the power plant to operate eight 250-horsepower Mosher boilers and one 500-horsepower Rust boiler. New equipment displaces a number of hand fired boilers. Installations were made by the Green Engineering Co., Pittsburgh.

The Wilshusen Mfg. Co., Topeka, Kan., has made a voluntary assignment to creditors. The company has been operating a machine shop and foundry. The action resulted from the decreased demand for disk sleds during the past few years. Assets are said to be greatly in excess of liabilities.

Extensive improvements have been made at the New Brighton, Pa., works of the Keystone Bronze Co., which increased the floor space by about 2,500 square feet. This will enable the Keystone company to turn out about 1,000,000 pounds of copper, bronze and brass castings per month.

The Carnegie Steel Co., Pittsburgh, is adding to its power plant a large 3,000-kilowatt Curtis condensing turbo-generator with a 35-kilowatt non-condensing turbo-exciter and switchboard apparatus. The General Electric Co., Schenectady, N. Y., is supplying the unit and making the installation.

The Stanley Rule & Level Co., New Britain, Conn., has practically contracted for additional building and machinery equipment. The company has not yet secured an adjustment of damages on its plant, recently damaged by fire, but the loss will probably reach only a few thousand dollars.

The Apollo Steel Co., Apollo, Pa., is equipping its plant with new electrical apparatus. This consists of a number of motors of various capacities and includes one large 1,400, six 10 and five 30-horsepower motors, two vertical motors of 10 horsepower rating and switchboard. The General Electric Co., Schenectady, N. Y., is furnishing the installation.

The following companies have recorded increase of stock or debt at Harrisburg, Pa.: New Castle Steel & Iron Co., New Castle, stock, $100,000 to $400,000; Pittsburgh Wire Co., Pittsburgh and York, stock, $10,000 to $20,000; Monessen Foundry & Machine Co., Monessen, debt, $13,000 to $35,000; Lebanon Blast Furnace Co., Lebanon, debt, $50,000.

The Luzerne Coal & Coke Co., recently organized, has obtained 75 acres of land along the Monongahela railroad, between Alica and Maxwell, Pa. Owners will begin immediate preparations for the erection of 40 ovens. J. H. Hillman Jr., Pittsburgh, and Homes A. Davis, Wilkinsburgh, head the new company. Eighty men will be employed.

A complete reorganization will be made of the Chattanooga Coal & Iron Co., Chattanooga, Tenn. The reorganization committee which recently purchased the property of the company for $500,000, acting through U. W. Chambliss, in the federal court, is preparing to file articles of incorporation. C. E. Buek, who has been manager of the property for some time, will remain in charge.

The Cincinnati Car Co., Winton Place, Cincinnati, O., has purchased the former plant of the Armor Steel Castings Co., which is located near the main plant of the former company, and will use it for the manufacture of steel trolley cars. The Armor property has been in the hands of a receiver for some time, and the purchase price paid by the car company was $67,000.

The Eureka Safety Razor Co., Kansas City, Mo., recently incorporated, advises that it does not expect at the present time to build a plant or buy any mechanical equipment, as it is seeking some concern to manufacture the razors for the time being. Several figures have been submitted, but the company has not decided to whom the contract will be awarded. There is a great difference in bids received.

The rolling mills attached to the West End Chain Works, Lebanon, Pa., owned by the Columbus Chain Co., Columbus, O., have been leased by the Lebanon Valley Iron & Steel Co., and will be operated to handle the orders accumulating. The plant is now being overhauled and may start this month. It consists of a puddle mill and two finishing mills. The Lebanon Valley company is also operating its parent plant at Lebanon and the Duncannon plant.

A meeting was held at Detroit, Mich., last week by the creditors of the Warren Motor Car Co., that city, at which plans were considered for extending time to the company to enable it to work out from under the pressure of obligations and continue in business. Two committees were appointed, one to check up material and stock and to determine what purchases were necessary to continue business, and the other to examine the financial side of the business.

The Brisco Iron Works, Lindsay, Cal., and the Braden Mfg. Co., Hanford, Cal., have been merged under the title of the Brisco Consolidated Iron Works. The capital stock is $500,000. Deep well pumps are manufactured by the Brisco Works, while the Braden company makes centrifugal pumps. F. N. Isaac, Hanford, is president of the new company, and H. A. Brisco, vice president. The board of directors includes these two officers and G. V. Reed, Lindsay, and G. Motheral, Hanford.

The Isthmian Canal Commission has awarded the American Cement Tile Mfg. Co., Oliver building, Pittsburgh, the contract for the roof covers of the Balboa shop buildings on the Pacific side of the Isthmus. The Cement Tile company advises that "Bonanza" reinforced cement tile will be used. The Balboa shops include 16 buildings and will require about 650,000 square feet of tile. Officers of the Cement Tile company will erect a plant on the isthmus and will manufacture under government inspection.

The Critchley Screw Machine Co., Worcester, Mass., has purchased the business of the Reed & Curtis Machine Screw Co., from the Reed-Prentice Co. The Critchley company will continue the business in the Reed & Curtis plant on Gold street, the ownership of which is retained

by the Reed-Prentice Co. The Reed & Curtis company was organized in 1895, with a capitalization of $20,000, and was one of five concerns merged into the Reed-Prentice Co., when that concern was incorporated last spring.

The Carnegie Steel Co. has ordered a 57-inch barometric condenser from the Mesta Machine Co., Pitsburgh, to be placed in the McCutcheon mills of the steel company. The Mesta company also has taken an order from the Bethlehem Steel Co., South Bethlehem, Pa., for a shear to cut 2½-inch square, and to be driven by motor power.

The new plant of Steel & Radiation, Ltd., at St. Catherines, Ont., was formally opened on Nov. 29, a large party of officials and others being present, including Sir Henry Pellatt, president of the company, Lieut. Gov. Sir John M. Gibson, Frederic Nicholls, of the Canada Foundry Co., and R. J. Cluff, general manager. The present equipment capacity of the plant provides for handling 20 tons of metal per day, but this will be increased until it reaches 100 tons per day. The present number of men employed is over 200.

The Brier Hill Steel Co., Youngstown, O., has recently placed contracts for two 1,500 turbo-generators and 17 electric cranes, to be installed in the open-hearth steel plant now under construction at that city. The General Electric Co., Schenectady, N. Y., will furnish the generators and the Morgan Engineering Co., Alliance, O., will build the cranes. The order for cranes includes two 150-ton ladle cranes, two 100-ton ladle cranes, two ingot pit cranes, two open-hearth charging machines and nine standard cranes.

The contract for installing forge shop equipment, including forges, anvils and piping in full, in the technical high school at Virginia, Minn., has been awarded to the Oliver Machinery Co., Grand Rapids, Mich., at $1,208. Other equipment which the company will furnish the school includes an American wood-turning lathe, $1,230; 15 Oliver No. 53 wood lathes, $2,210; grinders, $586.50; hand planer and jointer, $360.50; universal saw bench, $474; band saw, $459; hand trimmer, $98; electric glue heaters, $68.75, a total of $5,486.75.

The Willys-Overland Co., Toledo, O., recently incorporated, advises that there is no change in its status, or in its officers, the new corporation being formed in the same name as the old to take over the assets of the old company. The company is not contemplating any material increase at the present time by way of building. All of the increases necessary for 1913 business are now practically completed. There will doubtless be considerable addition to the machinery equipment, but definite plans have not been made.

The Buckeye Steel Casting Co., Columbus, O., has installed its sixth 9-foot self-discharging grinding pan at its plant at that city and has placed an order for three additional pans with the Thomas Carlin & Sons Co., Pittsburgh. This company also will ship a 5-foot pan to the Pittsburgh Iron & Steel Foundries Co., Pittsburgh, and a 7-foot pan and a Blake crusher to the Youngstown Sheet & Tube Co., Youngstown, O. A No. 3 shear with motor is being built for the Chicago, Burlington & Quincy railroad.

E. C. Stearns & Co. will begin operations this month in the Economy Foundry, Syracuse, N. Y., which they recently leased. The foundry is one of the largest of its kind in that city and between 150 and 250 men will be employed. The plant has been idle for some time and extensive improvements will be made. The foundry of the Stearns Hardware Mfg. Co., Oneida street, Syracuse, is operating at capacity and the increased business necessitated the leasing of the Economy plant, which will double the output.

Miscellaneous

The Des Moines Bridge & Iron Co., Des Moines, Ia., has been awarded the contract for the construction of a $5,500 steel elevated tank at Dunnville, Ont.

The Forest City Steel & Iron Co., Cleveland, was the low bidder for the steel work for that city's proposed high pressure pumping station, bids on which were opened last week. The company's bid was $11,965.

The Tabor Mfg. Co., Philadelphia, has just completed 30 10-inch power squeezers, mounted on wheel bases and they will be shipped to the new Erie, Pa., foundry of the General Electric Co.

Allis-Chalmers Co., Milwaukee, Wis., has received a contract from the city of Cleveland for three Allis-Chalmers steam turbines and alternating current generators, each rated at 5,000 kilowatts, to be installed at the municipal lighting plant in that city.

A crew of eight men has been sent by the William B. Pollock Co., Youngstown, O., to complete the government contract awarded the company to lay one-half mile of 8½-foot diameter steel riveted pressure pipe for the St. Mary's unit of the Milk river reclamation work.

The Key-Calk Horseshoe Co., Green Bay, Wis., which recently established a plant for the manufacture of steel horseshoes, is making a number of important improvements, including the construction of a 9,000 gallon oil tank, one of the largest owned by any industrial concern in Wisconsin.

An electric railway system extending from Gadsden, Ala., to the top of Lookout Mountain, will be constructed by the Lookout Mountain Railway Co., organized at Montgomery, Ala., with an authorized capital of $100,000. The charter also contains provisions for an increase of the capital and the construction of other lines in that vicinity.

The Chase Rolling Mill Co., Waterbury, Conn., is arranging for the installation of additional electrical apparatus in the Waterville plant. In the installation are included a 750-kilovolt-ampere Curtis turbo-generator with 35-kilowatt exciter and two direct generators of 25 and 50 kilowatt capacity. The apparatus is being obtained from the General Electric Co., Schenectady, N. Y.

Trade Notes

It is reported that the buildings of the Masuite Explosive Co., Sharon, Pa., will be leased by the United States Triple-Barrel Gun Co., which will locate in Sharon. The company is now operating a plant near Wheeling, W. Va.

The Gould Coupler Co. has leased one-half of the seventh floor in the 20-story building being erected on Madison avenue, Forty-first and Forty-second streets, New York City, and will use the space for executive offices.

The Arbuckle-Ryan Co., Toledo, O., machinery manufacturer, will move soon from 722-724 Monroe street, that city, to 222-224 Cherry street. The Monroe street location will be occupied by the Emerson-Brantingham Co., Rockford, Ill., as a display and sales room for harvesting machinery.

Fires

Fire at the warehouse of the Algoma Iron Works, Sault Ste. Marie, Ont., recently, caused a damage of $10,000 to patterns.